The Canadian Medical Association Journal

Vol. 62 FEBRUARY, 1950 No. 2

# RECENT ADVANCES IN OBSTETRICS OF INTEREST TO THE GENERAL PRACTITIONER*

**H. B. VanWyck, M.D.**

*Toronto, Ont.*

THE subject which I am undertaking this afternoon must of necessity cover a large field, and must pass under review many of the problems met with in obstetrical practice. That obstetrics has advanced in recent times can be seen in the improved results as shown in the decreased number of maternal deaths each year, and it should be at least a pleasant, if not as well a profitable, exercise to take some time and outline some of the major trends which have contributed to these recent and somewhat astonishing improvements.

There has occurred in our time a dramatic and sudden reduction in maternal mortality. About 1935 the deaths from child-bearing fell from a previous level of between 5 and 6 per thousand live births to below 2 and the rate is still declining. This reduction was long overdue. In spite of the great advances in the biological sciences upon which medicine depends, there had been little or no change in maternal mortality for the century before 1935. Other branches of medicine could claim declines in mortality rates. Since 1900 deaths from tuberculosis had been reduced by one-third; infant mortality had been lowered by one-half. That obstetrical mortality had apparently not profited by the general improvement in scientific knowledge was a reproach to the obstetrician. But today that opprobrium suffered by all who practised obstetrics has been terminated, and for the past fourteen years maternal care can claim achievements comparable to those of modern medicine and surgery.

This improvement has been the result of many general factors among which appears the more scientific approach to the understanding and care of pregnancy. No longer is obstetrics the despised practice of midwifery, but takes its place as a fully scientific branch of practice, a field in which modern concepts of medicine and surgery have a most beneficent application to the function of reproduction.

And, again, it is now recognized that this physiological function, always closely bordering on the pathological, requires for complete safety, the rich resources of the modern hospital. This is a really modern concept first held by our profession and now at last believed in by our patients. No longer need we break down opposition to admission to hospital for even the early stages of prenatal complications, and almost all patients seek the safety of the hospital delivery room. This change in popular opinion we have seen in our time. In most urban centres in Canada 95% or more births occur in hospital. As late as 20 years ago it was a truism that the greater safety from mechanical complications provided by a well-equipped labour room was balanced by the greater danger from sepsis which lurked in institutional care. Today, when sepsis has been almost completely banished from the hospital ward, the last basis for prejudice against childbirth in hospital has been abolished forever.

Before we begin the analysis of the specific factors which are each year in Canada now saving approximately 1,000 lives, one further general consideration is noteworthy. The improved results are due, in part, to the improved general health of the population which has resulted from better infant feeding. The mothers who are bearing children now are those who in their infancy were among the first to benefit by improved infant dietetic management, and the wide diffusion of rational ideas of a good diet has followed up the gain made by modern pædiatric practice. In brief, an infant given first a proper diet and then taught to choose the right foods in later life, of necessity develops and maintains a more efficient reproductive capacity.

* Read at the meeting of the Ontario Medical Association at London, May 22, 1949.

Specific changes for the better can well be described as ante partum, intra partum and post partum. Since 1900, the profession have taught the importance of prenatal supervision, and in this matter again, on a statistical basis, it can be proved that the lag in the establishment of popular belief has disappeared. The prenatal routine is now no longer just a perfunctory examination of urine, but may well include technical procedures unheard of a few generations ago. Routine x-ray examination of the chest is disclosing at least 1% of unsuspected active tuberculosis among prenatal patients; and this markedly reduces the risks of hospital spread, especially in the public ward. Today also, a routine blood survey is not adequate unless it includes blood grouping, Rh testing, Wassermann and hæmoglobin.

This blood survey should be begun in the early weeks of the pregnancy and the complete survey is most conveniently carried out in the laboratory of the hospital where the patient is to be confined. When this service is adequately organized, a small charge for the survey will cover the cost and build up a reserve to provide free the occasional expensive investigation that the rare serological Rh problems occasion. No further charge need be made in the cases requiring repeated antibody studies. Such organized blood surveys result in the pertinent information being in the possession of the physician, the patient and the hospital blood bank and this reduces the delay to a minimum when a crisis demands emergency transfusion. No longer need the patient receive an incompatible blood transfusion, sometimes fatal; nor need the erythroblastotic child be denied its chance of life. It is a truism now that adequate testing, including Rh, must be made as a routine before the giving of blood. This avoids two dangers.

First, the giving of Rh positive blood to Rh negative persons, who have been sensitized by either a pregnancy or a previous blood transfusion, may kill them. Secondly, the giving of Rh positive blood to an Rh negative girl or woman may sensitize her to the Rh antigen so that any Rh positive child born to her may perish with erythroblastosis fœtalis. These tragedies contributed their quota to the maternal and fetal mortality of past decades, but today they are preventable by Rh testing. These refinements have made transfusion safe; and adequate transfusion facilities have diminished markedly the hazards of childbirth. It has been estimated that Rh testing before transfusion will prevent about a fifth of the cases of hæmolytic disease as well as a certain number of fatal transfusion reactions. When Rh tests cannot be performed, all females who are not past the child-bearing age should be given only Rh negative blood to avoid sensitization. Rh testing during pregnancy means protecting the mother against incompatible transfusion should the need for transfusion arise, and also is the only way of predicting and preparing for a diseased child whose fate may depend on immediate and adequate transfusion with Rh negative blood. The essential details of the prenatal Rh investigation include the search for antibodies in all Rh negative expectant mothers and this should be repeated if negative for antibodies at the seventh month, or if positive for antibodies, at least every two months to follow the change in concentration of the titre. Should the mother have antibodies, whether the husband is homozygous or heterozygous is of importance. If homozygous, the child will be Rh positive and therefore probably affected. If heterozygous, there is a 50% chance of an Rh negative child and, therefore, one unaffected. When a child expected to be affected is born, a Coomb's test of the cord blood should be done at once, and if this is positive, the child must be carefully watched by repeated hæmoglobin estimations, and if necessary, adequately transfused. Whether when the birth of an affected infant is expected there is anything to be gained by premature induction of labour, is a controversy far from settled, but it would appear from the experience reported that the risks of prematurity outweigh the advantages gained.

This new phase of obstetrical care is the result of a discovery of major importance and its application is saving lives. Our patients, however, tend to become apprehensive and these fears should be allayed by the knowledge that approximately only 1 of 400 babies are affected adversely and that upwards of 75% of these can now be salvaged.

The dramatic implications of the Rh factor tend to divert interest from the more pedestrian hæmoglobin estimation, but prevention and treatment of the common anæmias of pregnancy must never fail to engage the attention of the

obstetrician. To permit a patient to begin labour with a low hæmoglobin is to needlessly expose her to added risks of hæmorrhage and sepsis. The hæmoglobin estimation is in general use and it is well-known that the average percentage in pregnancy is lower than in the non-pregnant. Percentages below 75 should be regarded as anæmias. Most of these are secondary and often of nutritional origin and will respond to the use of iron therapy and improved diet. (In some clinics grams of hæmoglobin per cent. are estimated; in others, the hæmatocrit reading.) Whenever anæmia is encountered examination of a smear should be undertaken to diagnose the type. Recent studies by Dieckman have shown that molybdenum iron complex has been found to be very effective in causing significant increases in hæmoglobin concentration within a three-week period. When anæmia is present in all cases a diet rich in protein may help. Severely anæmic patients with less than 8 grams of hæmoglobin per 100 c.c., or below 50%, should receive a blood transfusion before and after delivery.

The classification of anæmias as macrocytic, normocytic, simple microcytic and hypochromic-microcytic is helpful in choosing therapy. The bone-marrow pattern should disclose whether there is an increase in the hydræmia or whether a true anæmia is present. Hypochromic anæmia responds promptly to iron therapy, megaloblastic anæmia to liver therapy and transfusion.

The routine control of diet in the prenatal period has become a very important feature of prenatal care. Much has been written recently about nutrition in pregnancy and although there is much controversy among experts, there is no doubt left in the minds of the most sceptical that a good diet favours a successful pregnancy. It should also not be forgotten that malnutrition, even in infancy, may be the basis in after life for a poor reproductive function. The baneful arm of malnutrition may reach through many subsequent decades. It is the urgent and immediate duty of every physician conducting prenatal care to enjoin upon his patients a sensible dietetic routine in accurate detail. This may be laid down as follows.*

The nutritional allowances for the pregnant and lactating woman are set out either as a range or as an average. One must not forget that each patient is an individual problem and this principle applies especially to the total caloric intake. The total overall weight gain and rate of gain must be controlled. Should an individual patient show a sudden increase in *weight gain* over the 3 to 4 pounds a month (which is an average, normal rate for the last six months of pregnancy), prompt steps to reduce the caloric intake, such as the reduction of sugars, fats and starches and the elimination of salt, are indicated.

### I. CALORIC REQUIREMENT

(a) range of 2,000 to 3,000 calories per day (average weight gain must be limited to 25 pounds).

(b) carbohydrate 45 to 60% of calories, 225 to 350 gm.; fat 40 to 45% of calories, 90 to 130 gm.; protein 15% of calories, 75 to 110 gm.

It may be noted here that during the last few years most authorities have stressed the importance of a liberal protein intake in pregnancy. In spite of this, not a few physicians are still advising a restricted meat intake in pregnancy. They believe on fallacious grounds that meat predisposes to toxæmia of pregnancy. This old view goes back to the 19th century when it was held that eclamptic toxæmia was allied to uræmia. We now know that even acute toxæmia is characterized by no renal deficiency in the excretion of nitrogenous substances, and that such patients eliminate urea with ease. Pregnancy requires adequate protein for storage, for the maintenance of a normal serum protein level and fluid balance, and the provision of essential amino acids for fetal growth and the needs of lactation.

### II. MINERAL REQUIREMENT

(a) Iron—15 mgm. per day.

(b) Calcium and phosphorus—1.6 grams per day of which 2/3 should be supplied in milk.

(c) Iodine—0.2 mgm. per day.

### III. VITAMIN REQUIREMENTS

(a) Vitamin A—3000 to 6000 I U. per day.

(b) Thiamine—0.3 mgm. per 1000 calories.

(c) Riboflavin—0.5 mgm. per 1000 calories.

(d) Niacin—5.0 mgm. per 1000 calories.

(e) Ascorbic Acid—50 mgm. per day.

(f) Vitamin D—800 I.U. per day.

(g) Vitamin K—preferably 5.0 mgm. to the mother at least four hours prior to delivery or 5.0 mgm. intramuscularly to the infant immediately after delivery.

* The following nutritional requirements are those recommended by Professor E. W. McHenry of the Department of Public Health Nutrition, University of Toronto.

(h) Pyridoxin*—has not been found to be necessary in human metabolism and at present there is no basis for its use. It has been and is still being prescribed empirically in the treatment of nausea and vomiting of pregnancy and also in some microcytic anæmias.

(i) Vitamin E—as is the case with pyridoxin there is no evidence that it is necessary in human metabolism. It use has been suggested in the treatment of threatened abortions and in cases of poor tone in uterine muscle.

*Daily dietary requirements*

| | |
|---|---|
| Whole milk | 1½ pints |
| Citrus fruits | 1 orange or ½ grapefruit or 8 oz. tomato juice |
| Other fruits (fresh in season) | 1 serving |
| Vegetables (fresh green and coloured) | 2 servings (2 cups) |
| Potatoes (to be left out in overweight) | 1 serving (1½ tbsp.) |
| Meat (fish, fowl, liver and meat) | 1 serving (6 oz.) |
| Bread and butter (whole wheat bread) | 4 slices |
| Cereal (whole wheat, hot or cold) | 1 serving (½ cup) |
| Cheese | 1 oz. |
| Eggs | 3 to 4 per week |
| Vitamin D | 800 I.U. per day |
| Carbohydrate and fat | to satisfy energy needs |

The person's own natural selection will see that her needs of the staple items such as meat, potatoes, bread, etc., are met. The items that must be stressed are the protective foods; *milk, citrus fruits, whole grain cereals* and an adequate source of *vitamin D.*

Such a dietetic outline should be given in printed form to every patient. This does not mean, however, that the patient will follow the instructions. In a recent investigation by Professor McHenry, it was found that 28% of the patients took less than one pint of milk a day; 64% rarely took eggs; 28% took almost no citrus fruits; 60% used little whole grain bread or cereal; and almost all ate generously of potatoes, cake, pastry and meat. These results show that people are likely to consume adequate quantities of meat and potatoes and more than adequate amounts of cake and pastry. The protective foods are still the neglected foods. Such unbalanced diets are particularly undesirable in pregnancy when the needs of two individuals are involved. Hence, the physician would be well-advised to stress the importance of these usually neglected but essential nutrients. In other words, the physician would do well to concentrate the attention of his patient on the importance of the five following daily requirements:

1½ pints milk
1 orange or ½ grapefruit
4 slices whole wheat bread
1 serving whole grain cereal
800 units vitamin D

The cost of these five ingredients as thus listed is 23c a day. They supply 750 calories a day, one-third of the recommended total, and insure adequate intakes of calcium, phosphorus, iron, vitamin D, ascorbic acid and the B vitamins. Patients will take other foods, such as meat and potatoes in plentiful amounts and a vigorous emphasis on these few items will secure more attention than the presentation of a long list in which some of the items need no emphasis. If these items usually neglected are stressed, the customary food habits will take care of the remainder. The relationship between toxæmias and malnutrition is not clear; but it may be believed today that a proper diet before and throughout pregnancy tends to lessen the incidence of toxæmia of pregnancy.

Other factors in the prophylaxis of toxæmias would appear to be the prevention of excessive gain in weight; and routine weight estimation is an essential in modern prenatal care. An abnormally increased weight is usually due to salt and water retention; in other words, to œdema, and in the presence of this increased weight or any other manifestation of œdema, steps should be taken to correct the fluid balance promptly. These steps are rest, the restriction of table salt, the prohibition of soda bicarbonate, the reduction of needless calories in the form of excess starch and sugar, and the employment daily of a mild, saline cathartic.

A constant search for the early signs of toxæmia, œdema, a rising blood pressure and albuminuria, leads to the early detection of the toxæmic state; and, should these findings appear, prompt treatment, preferably in hospital, will prevent the appearance of uncontrollable eclamptic toxæmia. The strong, modern tendency to treat these cases early, and, if they do not respond promptly, to terminate pregnancy, *is* sound. To treat pre-eclampsia, even if only of moderate severity, more than two or three weeks, risks the patient's future. Cosgrove and his associates in their wide experience have shown that to treat even only moderate pre-eclampsia past the 34th week of gestation does not increase fetal salvage. Most clinics today, therefore, advocate the early interruption of all cases of pre-eclampsia except the mildest type whose

* A recent joint investigation by the Departments of Public Health Nutrition and Obstetrics and Gynæcology, University of Toronto, has shown clearly that pyridoxin is of considerable importance in pregnancy.

symptoms entirely clear up under rest and a medical regimen. By the same reasoning it is needless to delay interruption in any case of pre-eclampsia when within two weeks of term. This modern tendency will save many fetal and maternal lives and will also protect many mothers who might survive too prolonged treatment but live only to develop renal disease.

There are many changes in our attitude towards some of the more serious medical complications of pregnancy. For example, there is a more conservative tendency advocated today in the problem of tuberculosis in pregnancy. Termination of pregnancy for this complication is infrequently called for; and then *only* in the first trimester. With medical treatment and sanatorium care, the continuation of pregnancy is less hazardous than termination. A more important factor than the effect of pregnancy and labour on the patient is the stress and strain of the environment to which the patient may have to return. In cardiac disease, the cases may be divided into favourable and unfavourable, the unfavourable cardiac being defined as the patient who has reached a late stage of her heart disease and who has or has had heart failure. These patients run an unreasonable risk in pregnancy, should not become pregnant, and if they do, the pregnancy should be terminated early. The favourable cases are permitted to continue under strict supervision of both the obstetrician and the cardiologist. When these are allowed to continue, it is realized that the maximum burden on the heart is in the 6th, 7th and 8th months, after which, during the 9th month, there is a gradual lessening of the load on the heart, accompanied by an improvement in the condition of the patient. This improvement may be looked for and the spontaneous onset of labour awaited. In the absence of obstetrical indications, it is *not* now believed that heart disease is an indication for Cæsarean section. In pregnancy complicated by cardiac disease, natural labour with spontaneous onset and assisted by forceps in the second stage, is safer than Cæsarean section; and, of course, termination by induction of labour or Cæsarean section should never be attempted during an episode of heart failure.

On the other hand, in diabetes mellitus (in the interests of the child) there is an increasing tendency to deliver the diabetic by Cæsarean section. The child runs a very great risk during the last weeks of pregnancy and most clinics advise termination of the pregnancy at about the 37th week. If the cervix is ripe, natural labour may be induced by rupturing of the membranes, but if at this time a vaginal examination discovers an undilated, unsoftened, elongated cervix, Cæsarean section is advocated in the interests of the child. This radical decision becomes less radical if one considers that a diabetic mother should not have more than one or two children.

As for the patient with renal disease in pregnancy, if the patient is approaching or has entered the stage of demonstrable renal insufficiency, intervention at any stage of pregnancy where such insufficiency is encountered is justified in the interests of the mother who may have otherwise many years to live. Such are among the more important medical problems that confront us in the conduct of pregnancy. In the solution of these, the modern concepts that have been outlined have undoubtedly contributed much to the safety of child-bearing, even though complicated by tuberculosis, heart disease, and diabetes mellitus.

It is obvious, however, that even the most normal patient whose pre-natal course has been uneventful and whose health has been successfully protected may, with the onset of labour, be subject to critical hazards at delivery. The major hazards are ante partum hæmorrhage and difficult labour due to malpresentation, and disproportion.

There has been a great change in therapeutic policy over the past decades in the treatment of ante partum hæmorrhage. It is now an unquestioned routine to send all patients with ante partum hæmorrhage to hospital for investigation and treatment. No longer is a patient permitted to remain at home until recurrent hæmorrhages frighten the family and attendants into deciding on hospital admission. It has been shown that a small, initial bleeding does not mean necessarily a minor degree of danger. The slight bleeding today is always taken to mean the possibility of a grave crisis ahead. On admission to hospital a routine examination, blood grouping and typing, x-ray investigation, and, finally, a vaginal examination to prove the presence or absence of placenta prævia is an inviolable routine. The usual cause is either accidental hæmorrhage or

placenta prævia and as a rule, the presence of either demands the termination of pregnancy. The exceptions to this rule are the cases in which the child is previable or in an early stage of viability, and in these cases, if the bleeding is slight, the patient may be kept in hospital where a serious turn of events may be promptly dealt with. But with these few exceptions, once ante partum hæmorrhage has been diagnosed a clear plan of treatment may be defined. In cases of accidental hæmorrhage labour may usually be induced by rupture of the membranes which serves two purposes, to control the bleeding and expedite delivery. Few Cæsarean sections need be done for accidental hæmorrhage; only, in those instances, fortunately rare, in which with a closed cervix and a grossly damaged uterus, a Porro section is necessary to save the maternal life.

In the case of placenta prævia many have been the methods advocated and for these methods a bewildering and complicated outline of indications were advocated. Such therapeutic procedures as version, internal podalic and Braxton-Hicks, the hydrostatic bag and packing have been thrown into the heap of discarded and dangerous manœuvres. Today, one may dogmatically teach that there are two types of placenta prævia, those cases which can be successfully delivered through the natural passages after rupture of the membranes with the mother unimperilled, and a surviving child; and those which require Cæsarean section. When making the final vaginal examination at which the diagnosis can be accurately made, these two types can be differentiated. If the presenting part is engaging and the cervix is dilating, and there is only a moderate degree of incomplete placenta prævia, and the hæmorrhage has ceased with rupture of the membranes, successful delivery from below may be awaited. If these conditions do not obtain, it is almost universally held today that Cæsarean section should be performed. These principles in the treatment of antepartum hæmorrhage which have been simplified and clarified during the past two decades have reduced the maternal mortality from these conditions to a minimum of not more than 1 or 2% and, of course, the improved results have been made possible not only by this more rational, mechanical approach, but because of the adequate and prompt supportive treatment made available by adequate blood bank and transfusion service.

The problem of cephalo-pelvic disproportion, by which either the head is too big or the pelvis too misshapen or too small, is one which will perhaps never be completely solved on exact, scientific lines. There are too many factors incapable of exact assessment; and the prognosis of the type of labour before its onset, in borderline cases at least, will never be reduced to an exact science. There are too many imponderables. The strength and efficiency of the uterine contractions, the flexion and moulding of the fetal head, the polarity of the various zones of the birth canal, the co-operative function of the cervix, the psychic and somatic endurance of the patient—these cannot in most instances be more than approximately foretold. Even if we had absolute methods of mensuration of the fetal head and the maternal pelvis which, unfortunately, we have not, the unpredictable and many-fold factors in labour make a prognosis only a shrewd guess. Hence, for the most part, except in those rare cases of absolute disproportion a good obstetrician must rely on a test of labour and in this test of labour, he must draw on rich sources of judgment and experience. In my view, to attempt in most cases to determine the necessity of a Cæsarean section before at least the onset of labour will lead very often to a needless Cæsarean section. This problem of disproportion then requires the proper use of the so-called test of labour, and it is needless here to describe how such a test should be conducted. Suffice it to say that during the test the patient must be protected from contamination, dehydration and exhaustion. When reasonable judgment is exercised, the necessary Cæsarean may be decided upon before the patient has been too long in labour. Judgment, however, is difficult in these cases and the wisest will at times discover after too great a delay that successful delivery below is going to be impossible. A quarter of a century ago such faltering judgment brought tragedy very close. Today, with antibiotics and the extra-peritoneal section, the obstetrician fortunately may still find a way safely out of the predicament which better judgment would have avoided.

The status of pelvimetry has changed much in recent years and many and divergent are the views expressed as to the value of the various

pelvimetric methods. External pelvimetry is of so little use that many modern teachers are advocating the discontinuance of the intercristal, inter-spinous and external conjugate measurements. However, while all are agreed that these measurements are of little value, they may at times give some inkling of pelvic type and, therefore, may well remain part of the routine. Of internal pelvimetry much more can be claimed; and, while the estimation of the true conjugate from the diagonal conjugate is open to considerable error, the internal examination may reveal other points of pelvic architecture, such as the shape and size of the sacrum, of the sacro-sciatic notch, the length of the sacro-spinous ligament, the divergence or convergence of the pelvic walls and the infra-pubic angle. Outlet measurements are now recognized as of prime importance, but even here the difficulty in obtaining accuracy has led some to class these measurements as unreliable.

X-ray pelvimetry was first described about 1900, but within the last twenty years it has become a widespread practice. There is the widest divergence of opinion among experts as to the value of x-ray pelvimetry. Some regard it as useless and some as even misleading. At the other extreme are those who have a naive belief that they can solve all the perplexities of cephalo-pelvic disproportion by the scrutiny of a few films. Some of these extremists are obstetricians and some are roentgenologists, and both of them believe that they can prognosticate a labour complicated by pelvic contraction. The truth lies between these two extremes. Even given accurate x-ray measurements of both pelvis and fetal head one cannot be sure of a prognosis and must, in borderline cases, rely on a test of labour. Nevertheless, x-ray measurements and morphological data do enable one to conduct a test of labour in borderline problems with much more intelligence.

The value of x-ray pelvimetry could be defined as follows: (1) If properly done by one of the recognized methods, such as the Snow or the Thoms, by an efficient technician of experience, the measurements are more accurate than those obtained in any other way. (2) X-ray pelvimetry enables us to obtain measurements such as the transverse diameter of the inlet and the inter-ischial spinous diameter never previously obtainable. This latter diameter should approximate 10.5 cm. and when it is less than this one may anticipate mid-pelvic arrest. (3) X-ray pelvimetry enables us to visualize the type of the general architecture of the pelvis and it may be stated that often morphology is of more importance than mensuration.

It must be stressed again and again, however: (1) That the clinical consideration of the overall picture in any problem of dystocia is paramount. (2) That anything less than a proper method used with technical efficiency is useless. Nothing can be more misleading in regard to the relationship between the size of the pelvis and the size of the fetus than a flat plate of the abdomen and yet it is still too common a practice to decide on the election of Cæsarean section on the meagre and false information given by a flat plate. (3) That the obstetrician as well as the roentgenologist should learn to interpret the films.

The interpretation of the many variable factors in a problem labour requires experience and judgment and any form of pelvimetry, including x-ray, is only a contributory adjunct to the clinical picture.

The problem of the relief of pain in labour has stimulated the search for the ideal pharmacological agent. The ideal, that is yet unachieved, should relieve bodily pain without interfering with the normal metabolic processes of mother and child. It should have no risk or unpleasant effect. It should not interfere with the mechanism of labour. It should be prompt and even in its action, quickly eliminated from the body and free of untoward effects during convalescence. The multitude of drugs which are in present use reveal the fact that the ideal agent is as yet undiscovered. Drugs administered by mouth, per rectum, by hypodermic, intramuscular or intravenous routes pass into the fetal circulation and toxic effects on the child are always possible. These toxic effects become more hazardous in the case of the premature infant. The harmful effects on the child may readily be augmented by the varying degrees of anoxæmia caused by depression of the maternal respirations or insufficient oxygenation accompanying the administration of the agent. These factors are important in the production of fetal asphyxia. On the other hand, regional anæsthesia by local, spinal, caudal and paravertebral methods, while they achieve adequate relief of pain without subjecting the child to toxic effects, require specialized technical skill and are not

themselves free from special maternal danger. Spinal anæsthesia has been developed as a routine for vaginal delivery in many centres and thousands of cases have been reported without mortality. The same may be said of continuous caudal anæsthesia. On the other hand, these methods, especially continuous caudal, have given in less efficient hands a considerable mortality; and those who are competent to judge of these methods all emphasize great caution in the development of these techniques. These forms of anæsthesia are efficient and safe only in the hands of the skilled anæsthetist who thoroughly understands the action of the drug, the altered physiology of pregnancy and the anatomical technique involved. These methods postulate exacting requirements, and hence many sound obstetricians would reserve them for special indications only.

A common, average practice today would appear to be the use of demerol and hyoscine, or heroin and a barbiturate, such as amytal, repeated as required throughout the first stage of labour. During the early part of the second stage, light intermittent administration of nitrous oxide and oxygen is still the method of choice for most. For delivery cyclopropane which permits the administration of adequate oxygen is a satisfactory routine, but should be used only for a minimal period. Under its influence the separation of the placenta in the third stage is usually prompt and efficient. Special circumstances, however, are met by those who use the above routine by the use of some of the more special techniques. Spinal anæsthesia in doses of not more than 50 to 60 milligrams of procaine protects the premature child which might suffer from the routine inhalation anæsthesia. Local pudendal block offers the same advantage to the premature. On the other hand, spinal anæsthesia is contraindicated whenever intra-uterine manipulations are undertaken. For these, the relaxation that can be afforded only by the deeper anæsthesia of ether is necessary. Other contraindications to spinal anæsthesia are shock, anæmia, and the hypotensive state. Spinal anæsthesia is more and more being used satisfactorily for Cæsarean section and is specially indicated where the infant is premature or the mother has a respiratory infection; but it must be emphasized that the dosage for the safe conduct of Cæsarean section must be based on an obstetrical standard rather than a surgical one; for example, not more than 100 milligrams of procaine need be used. It is necessary for safety in the pregnant woman at term to keep the anæsthetic effect not higher than the umbilicus.

A comparatively recent addition to the resources of the anæsthetist is curare. This drug in therapeutic doses may be used to relax the soft tissues of the pelvic outlet and can be employed usefully as an adjunct to cyclopropane anæsthesia. The rapidity with which new drugs and new techniques for the relief of pain in labour are brought before the profession is bewildering, and there is every likelihood that future developments will add to the complexity of the field. The views just cited, however, are those which may be safely held by practitioners who find their safety in following a conservative, middle course.

One may not leave the problem of the relief of pain in labour without citing the work of Grantley Dick Reid. One need not go to the extreme of ceasing to use analgesics and anæsthetics in labour entirely to admit that Reid's concepts as set forth in his "Childbirth Without Fear" have a message for every practitioner of obstetrics. His main thesis is that fear acting through the thalamus brings the sympathetic nervous system into play and causes a tightening of the sphincter-like lower segment. Reid insists that if fear can be overcome, pain will cease. This principle is substantiated by the experience of obstetricians. Fear does make a painful labour and every obstetrician insofar as he gains the confidence of his patient is able to that extent to make her labour that much easier. It also explains the benefit of the analgesic agents properly used that results from their tendency to allay tension and promote relaxation. Even though one must regard Reid as an extremist, his emphasis on the importance of mental and physical relaxation should be heeded by every parturient as well as her physician.

A marked improvement in the delivery room is the altered technique in the resuscitation of the newborn. Obstetrical practice has travelled a long way from the rude methods which were adopted up to a short time ago in the attempted revival of the asphyxiated child. These improvements have been stimulated by a better understanding of the various factors which lead to asphyxia and of the danger to the

nervous system of the baby who is revived from even a short duration of asphyxia. To quote Barcroft, "Nervous tissue is more sensitive to deprivation of oxygen than any other tissue. Anoxæmia of mild degree impairs its co-ordination. Even a short duration of anoxæmia abolishes its functional activity. Complete anoxæmia maintained even for ten minutes, or less acute for a longer time, may lead to irreparable damage to the nervous system." This well-substantiated view obliges the obstetrician to take immediate and scientific steps to resuscitate new-born babies who do not breathe properly. To use any but approved modern methods or to wait for the probable spontaneous onset of respiration has now become indefensible practice.

The prevention of asphyxia begins while the child is still *in utero*. The physician should direct the course of labour into normal channels and avoid needlessly traumatic interference. The excessive use of analgesics, especially of morphine and its derivatives, of oxytocics (pituitrin and quinine), of general anæsthetics, especially the prolonged use of concentrated nitrous oxide, tends to produce antepartum asphyxia, and the child when born may be difficult or impossible to resuscitate. These dangers are, of course, much greater to premature babies. During delivery a needlessly hurried or too prolonged second stage will result in fetal loss and premature babies may be lost even at Cæsarean section unless either local infiltration or spinal anæsthesia is used. After delivery the child should be held by the feet head downward and the mucus cleared from the nasal passages and pharynx by means of an ordinary mucus tube. This should be done before the child takes its first breath. If respiration begins promptly one may wait until the pulsations in the cord cease before the cord is severed, thus enabling the infant to retain the extra blood required to fill the pulmonary circulation. If, however, the child does not breathe promptly, it is of immediate importance to deal with the asphyxia without any delay. If the child is held at first head downward there is a tendency for the spontaneous escape of obstructing fluids from the respiratory passages and in this position the ordinary mucus tube will clear the blood and mucus from the throat. If the child does not now gasp or if it is obvious that its attempts to breathe are failing probably because of a blocked trachea, the baby should be laid on warm towels and a catheter passed into the trachea. By this means the obstructing material can be moved by mouth suction. Usually when this is successfully accomplished the respiratory centre being still responsive, nothing more need be done. If improving respiration is not immediate after the larynx and trachea have been cleared, oxygen must be supplied at once. A simple way is to blow very gently with only so-called cheek pressure through the catheter. This must be gentle or else there is danger of rupture of the lung. By this simple means, or attaching a flow of oxygen to the catheter with an open vent to maintain low pressure, the air or oxygen will reach whatever alveoli are open. While this gentle insufflation is being carried out, no forcible means of artificial respiration need be undertaken beyond a gentle teetering of the infant's body. Unless the respiratory centre is gravely depressed an open airway and a warm environment will usually be successful in initiating respiration. The use of the complicated and expensive respirators would not seem to have any advantage over the simpler intratracheal catheter with gentle insufflation, and the simpler methods are safer.

Those who have practised obstetrics back in the era when the asphyxiated baby was rudely treated by alternate hot and cold baths, frantic and violent efforts at artificial respiration and the injection of stimulating drugs with no attempt to clear an obstructed airway must regard the improved methods of resuscitation as among the most valuable life-saving advances in the practice of obstetrics.

It is a truism to state that one's duty in the conduct of the process of both abortion and labour is to conserve the patient's blood. It still remains true, however, that whereas deaths from sepsis and toxæmias have been radically diminished, there has not been a corresponding reduction in deaths from hæmorrhage, both ante and post partum. Indeed, if one analyzes the vital statistics, it will be found that in deaths attributed to sepsis and toxæmia, hæmorrhage is often an important factor in the fatal outcome.

It is now believed that most deaths from post partum hæmorrhage are preventable. Proper conduct of the second and third stages will prevent almost all post partum hæmorrhages and

should, in spite of meticulous care, post partum hæmorrhage occur, the prompt administration of adequate blood replacement will usually prevent a fatality. A certain specific routine of technique as advocated by Dieckman and his colleagues lays stress on the slow delivery of the baby. The routine technique carried out at the Chicago Lying-In illustrates the principles with which most obstetricians would agree. These are set out by Dieckman as follows: (1) Deliver the anterior shoulder (2) wait 30 seconds and deliver the posterior shoulder; (3) inject two minims of posterior pituitary solution, then slowly deliver the baby, the total delivery time being three minutes.

When the cord has ceased pulsating it is held close to the vulva, stripped once towards the baby and clamped. When the placenta is in the vagina and the uterus is contracting, it may be delivered by gentle fundal pressure. All placentæ are removed manually if necessary at the end of one hour, and some would advocate a maximum waiting period of not more than 30 minutes. Usually, if the anæsthesia has not been too profound and especially if cyclopropane or spinal has been used for delivery, the placenta separates spontaneously and can be delivered within fifteen minutes. If during this waiting period there is hæmorrhage, the placenta is expressed or removed manually at once. When the placenta has been born intravenous injection of ergometrin 1/8 mgm. or intramuscular 1/2 mgm. is given. If the placenta has been delivered and yet bleeding still continues, repeat the injection of ergometrin, explore with a gauntleted hand lubricated by Dettol cream the uterus for an accessory lobe and to exclude rupture, and briskly massage the uterus through the abdominal wall. If bleeding continues despite these prompt measures, and manual compression, the uterus should be packed. Such routine will control almost all cases of atonic post partum hæmorrhage and, of course, during and after the hæmorrhage blood in amounts sufficient to replace loss should be given.

There has been a vast improvement in the application of the mechanical and manipulative methods of delivery. Few will now attempt internal podalic version in the presence of its well-known contraindications and with a saner attitude towards the election of Cæsarean section in labours which promise to be unreasonably traumatic, the indications for internal podalic version have become markedly fewer. The more expectant treatment of breech delivery has justified itself by its results. Conservative manual assistance is usually all that is required in the delivery of a breech and should there be an arrest in the second stage, the bringing down of a leg need not necessarily be followed by a too-hasty breech extraction. The concept of prophylactic low forceps has now replaced the ultra-conservatism of the midwife. This has been practised by the specialist long before it became general teaching to the medical student. It should be pointed out, however, that this applies only to the head on the perineum, or more properly to the head whose largest diameter is at the outlet of the pelvis and past the plane of least pelvic dimension, and it must be emphasized to the student that prophylactic forceps does not apply to the head arrested in the mid-pelvic plane. For this complication often more time and patience is required. To attempt to terminate a second stage by mid-forceps delivery without waiting for the maximum degree of moulding and descent of the head which nature can effect is to subject both mother and child to needless trauma and invites disaster. In these instances the more patient methods of the midwife would be infinitely safer.

While the proper use of prophylactic forceps may be regarded as a modern and valuable concept, the old conviction that the premature and injudicious use of the obstetrical forceps still continues to exact a relentless toll of damaged bodies and preventable deaths must always be kept before our profession. This inefficient practice best defined as forceps extraction through an incompletely dilated cervix or a birth canal improperly prepared is, of course, invited by unstable judgment of the obstetrician too readily swayed by the insistence of the patient unrelieved of pain. To this problem modern analgesia has made its greatest contribution. The patient relieved of her pain ceases to implore the obstetrician to undertake premature interference and such interference is thus delayed until it can be safely undertaken. In any discussion of the advantages and disadvantages of analgesia this great benefit must not be forgotten inasmuch as analgesia in preventing early and unwise attempts at delivery will continue to save uncounted maternal and fetal lives.

Other concepts changed for the better would include: (1) earlier rising; (2) the intelligent

use of anti-coagulants in post partum thrombosis; (3) the scientific use of antibiotics in puerperal infection; (4) the value of the ultraviolet lamp for the healing of perineal repairs; (5) the almost routine use of episiotomy in the primipara; (6) the ante partum administration of vitamin K; (7) the importance of meticulous post partum examination: all these may be cited as contributing their share towards improving the maternal and infant care. With the increased efficiency of hospital laboratories, blood banks and operating room facilities has developed an acutely awakened obstetrical conscience. Obstetrics, always an art, has become more and more a science. Medical curricula are recognizing this in the teaching centres and the avidity with which obstetrical literature is being read and with which papers are being heard in medical societies throughout the world, augurs well for the future. Preventable obstetrical disasters are on their way to elimination.

One of the most salutary methods of improving the standards of obstetrical practice is the establishment of maternal death survey committees. These are already in successful operation in many centres in America. One might cite as successful examples such committees which have been organized in New York, Philadelphia and Chicago. Such committees with the co-operation of the local health authorities are enabled to obtain the data concerned with each maternal death in their locality. The deliberations of the committee are strictly anonymous with regard to the name of the patient, the hospital and the medical attendants involved. In some communities, the committee deliberations are held in open meetings to which the local medical and nursing profession may attend. In some the deliberations are in closed conference but in either case the physician or physicians concerned are invited to attend and assist the committee. An assessment of the factors preventable and non-preventable is made impartially and in strict anonymity. These deliberations are then available after some time has elapsed for publication. It must be quite obvious that such reviews and analyses of maternal deaths in which the various factors of good or bad treatment have been impartially determined could have a tremendously great educational value. Most of us learn more from our unsuccessful cases than we do from those which have been uneventful. The publication of these detailed tragedies enable each of us to review the experience of a large number of our fellow practitioners and thus much experience may be gained, much more than any one individual could possibly accumulate in a long lifetime no matter how great his opportunity.

Both the Canadian Medical Association and the Ontario Medical Association have advocated through their Maternal Welfare Committees that these maternal death survey committees be established throughout the provinces. This will require the understanding and the co-operation of each member of the medical profession and a plea is hereby made that each member of the O.M.A. give his support to any attempts that may be made locally to set these surveys in operation. It may be of interest to note that the Toronto Academy of Medicine in co-operation with the local municipal and the Provincial Board of Health is sponsoring a pilot plan in Toronto. It is hoped that in this area a maternal death survey committee may be organized and functioning this fall. If the committee obtains the co-operation and the confidence of the local profession the plan will work. Wherever the plan has been in operation in the centres cited above those who can speak with authority attribute to it a very definite improvement in the general efficiency of maternal care.

In conclusion, a survey has been attempted in which many of the modern advances and changed concepts of obstetrical care have been discussed. It may be claimed that our era has been distinguished by unusual progress, and this claim can be substantiated by pointing to the gratifying improvement as shown by the vital statistics tables. As compared with the years before 1935, our profession is saving each year in Canada approximately 1,000 lives that under methods of practice in vogue before that time would have been lost. It is unbelievable that we have reached the ideal, and it will continue to be the aim of all those who by research, teaching and practice endeavour to attain the highest possible standard to reduce maternal mortality to the vanishing point.

Medical Arts Bldg.

# ARTIFICIAL RADIOACTIVITY*

**J. W. T. Spinks**

*University of Saskatchewan, Saskatoon, Sask.*

ARTIFICIAL radioactivity is the radioactivity exhibited by substances which have been made radioactive by artificial means such as neutron bombardment or bombardment by high energy particles and photons. One of the best sources of neutrons is the so-called "atomic pile" in which atomic energy may be released at a controlled rate. We in Canada have such a pile at Chalk River. When this pile operates enormous numbers of neutrons are produced and in fact, it has recently been disclosed that the neutron flux in the Chalk River reactor is $4.3 \times 10^{13}$ neutrons per sq. cm. per sec., by far the highest neutron flux steadily available for research purposes in the world. This has made possible the production of radioactive isotopes of practically all the elements. One which has been in great demand is radiophosphorus. Radiophosphorus may be made by bombarding ordinary phosphorus with neutrons in the atomic pile. An ordinary phosphorus atom weighs 31 on a certain scale and is designated $P^{31}$. When such an atom absorbs a neutron, weighing 1 on the above scale, $P^{32}$ or radiophosphorus is formed. $P^{32}$ is chemically identical with $P^{31}$ but differs in that it is radioactive. It emits negatively charged particles called electrons which can be detected and measured using a suitable counter, the favourite one being a Geiger Muller counter. When the counter is connected to a suitable recorder, the recorder clicks, and the activity can be measured quantitatively. By means of the activity, the atoms are so to speak, labelled or tagged and we can follow them or trace them wherever they go, even if they are later mixed with a large number of inactive phosphorus atoms.

This is the fundamental principle of tracer reactions. Now let us see how the radioactive isotopes may be used.

As you know, we in the west grow wheat; in a good year, a billion dollars worth, in a poor year, a hundred million dollars worth. The average yield is about 15 bushels per acre and it is found that the yield for most soils can be raised quite appreciably by using phosphate fertilizer. Valuable information about the uptake of fertilizer by wheat plants can be obtained by incorporating a small amount of radioactive phosphate in with the fertilizer phosphate. As the plant grows it absorbs both soil phosphorus and radioactive fertilizer. When the plant has reached the desired stage of growth it is ashed and the activity of the ash measured under a Geiger Muller counter. From the measured activity, the fertilizer uptake can be calculated. By ordinary chemical analysis, we can find the total phosphorus uptake. By subtracting the amount of fertilizer phosphorus we obtain the amount of soil phosphorus taken up, *something which could not possibly have been done by ordinary chemical means.* Before the advent of radioactive phosphorus, fertilizer uptake used to be determined by subtracting the phosphorus taken up by the control plants from that taken up by the fertilized plants. It rested on the assumption that fertilized and control plants took up the same amounts of soil phosphorus and actually our experiments have shown that often this is not true.

The first experiments were done over two years ago in the corner of a field at Floral, near Saskatoon. Other experiments were done in the greenhouse and this last summer we were able to obtain enough $P^{32}$ from Chalk River to carry out large scale field experiments in three parts of the province of Saskatchewan—Humboldt, Birch Hills and Aberdeen.

Among the many interesting results coming from such studies is the fact that in the first two weeks of growth, over 80% of the phosphorus in the plant came from the fertilizer but subsequently, more and more comes from the soil until, at maturity, over 90% of the phosphorus in the plant has come from the soil. It would thus appear that the action of the fertilizer is due, at least in part, to the initial "kick" which it gives to the young plant in its early stages of growth. Soils chemists had suspected that this was the case but it was only after the advent of radioactive phosphorus that it was possible to make quantitative measurements. It was also found that for our particular soil, only about 25% of the applied fertilizer was used by the plant, the remaining 75% being "fixed" by the soil. Subsequent experiments indicated that a second crop,

* Read at the Eightieth Annual Meeting of the Canadian Medical Association, Section on Radiology, Saskatoon, June 15, 1949.

grown on the same soil, but without the addition of more fertilizer, is able to make use of some of the original fertilizer, but to a greatly reduced extent.

In other experiments we have studied the effect of varying the rate of application of a given fertilizer and have compared different fertilizers such as ammonium phosphate, sodium phosphate, monocalcium phosphate, dicalcium phosphate and so on—all with very interesting results. Already this powerful new tool has yielded fundamental results of great value which will lead to a better understanding of fertilizer utilization and there is every reason to believe that it will eventually lead to better fertilizer practice.

Before leaving the problem of fertilizer uptake I think I should tell you something about the so-called radioautograph method. In this method the plant is fed a radioactive isotope, say $P^{32}$, and the plant is then placed on a photographic plate and is left in the dark for some hours. The radiations emitted by the radioactive phosphorus affect the photographic plate and when the plate is later developed the plant is seen to have taken its own photograph. The accumulation of phosphorus in various parts of the plant is shown by light areas in the print. This method provides a valuable additional technique in studying plant metabolism.

I need hardly say that carrying out experiments of this kind requires co-operation between the soils chemist, the farmer and the radiochemist.

I should also perhaps emphasize here that the radioactive isotopes are used as research tools and not as something added to fertilizers to enhance their growth properties. As far as is known, radioactive isotopes do not stimulate plant growth and the effects apparently observed in Japan following the dropping of the atomic bomb can very well be explained on other grounds—the burnt vegetation probably acted as fertilizer for the next crop.

Having had some success with applying $P^{32}$ to the problem of fertilizers we have extended the studies to the problems of phosphorus metabolism in laying hens. You may or may not know that the mash given to laying hens usually contains phosphorus in the form of bone meal. Bone meal is mainly calcium phosphate and it is an easy matter to replace the bone meal by radioactive calcium phosphate. The eggs subsequently laid by the hen are radioactive and one can easily measure the activity quantitatively and hence calculate the amount of phosphorus, from the one feeding of active $Ca_3(PO_4)_2$, coming through in the various eggs and parts of the egg. We find relatively little in the shell and the white but a large quantity in the yolk, the amount in the yolk reaching a maximum at about the fifth egg. There is a marked break in the curve at about the tenth egg, and this is very nicely explained by the fact that there are about ten eggs being formed in the hen at any one time, so that the tenth egg could have received phosphorus more or less directly from the material fed whereas eggs after the tenth must have received the phosphorus indirectly via the metabolic pool. This is in general agreement with the idea that the materials in the body of the hen are continually being broken down and reformed. Thus some of the phosphorus in later eggs must have come from the muscle and bones of the hen and this is supported by the fact that about six weeks after feeding the active calcium phosphate, the left tibia of the hen contained about 6% of the original active phosphorus.

Naturally, one usually feeds the hen every day and thus the phosphorus in any one egg comes from the phosphorus fed on many different days. Eventually, if the hen feeds regularly and lays eggs regularly, the amount of phosphorus coming through per egg should reach a limiting value, and it can be shown that this actually is the case.

Other experiments have been done with feeding radioactive calcium carbonate to laying hens. Here the effect is quite different. In a single-feeding experiment with calcium about 30% of the calcium carbonate appears in the second egg and this is very nicely explained by the fact that the shell is laid down by the bird in the 30 hours preceding the laying of the egg.

Still other experiments have been done on the hatching of radioactive chicks from radioactive eggs, obtained by feeding the hen radioactive phosphorus. The eggs can be incubated and hatched in the normal way and give rise to perfectly normal looking chicks — even though the hen did regard the first one somewhat suspiciously, particularly when the chick started clicking instead of clucking!

Again, the quantitative measurement of $P^{32}$ in various parts of the embryo and the developing chick enables us to make interesting observations concerning the metabolic changes occurring in the developing chick embryo.

Still further experiments have been done on the utilization of glycero-phosphate by the laying hen with a view to elucidating phosphorus metabolism. Once again, these experiments do not immediately result in the poultry man getting more money for his chicks or his eggs but it does enable the poultry scientist to get a better understanding of what goes on when the hen he feeds lays eggs and hatches out chicks. And eventually, no doubt, this increased knowledge will result in improved poultry practice.

One or two other applications that we have made will be touched on very briefly. You have probably heard that cobalt deficiency in sheep is a serious problem in certain parts of Australia. It appears that it may also occur in certain areas of Canada, although here the economic results are not as important as in Australia. The problem can be readily studied by using radioactive cobalt which emits very penetrating gamma rays and has a half life of 5.3 years. The results already obtained promise to give valuable information concerning cobalt deficiency in sheep.

The same penetrating rays from radiocobalt are being used to study the habits of wireworms, illustrating an application of radioactive isotopes to insects and pest control generally. Other tracer studies are being made with insecticides labelled with radioactive phosphorus and with organic compounds labelled with radiocarbon. The latter experiments are being done in co-operation with the department of physiology.

As a final application I must mention the action of the radiations themselves. Consider, for example, a wheat plant. The type of wheat plant is determined by the nature of the genes and chromosomes existing in its cells. When changes occur in the genes, new varieties of wheat, so-called sports or mutations, are produced. Some of the mutations occur naturally and the work of Muller, the Nobel prize winner, has indicated that the mutation rate can be greatly increased by the action of x-rays and other penetrating radiations.

Suppose now, that we allow a plant to take up radioactive phosphorus, some of this radioactive phosphorus will be incorporated into the genes themselves and still more will be incorporated into the surrounding cells. The radiations from the $P^{32}$ are able to smash up the chromosomes. It would seem likely also that mutations would be produced. We have not yet had time to show whether this is or is not the case in wheat but we have been able to show the effect in the fruit fly—Drosophila—long a favourite organism for the study of mutations.

Thus, to summarize, we can say that one of the most important present applications of atomic energy is in the production of radioisotopes for use as tracers to be used in the elucidation of a great variety of problems. The next most important effect is the genetic effect of the radiations and finally, somewhere in the future, comes the useful application of large scale atomic power.

Naturally, the applications of atomic energy will come to nothing if atomic energy control is not soon established on an international scale. This aspect of atomic energy seems to be the particular concern of the statesman, the diplomat and the politician and in leaving this particular aspect to them, the scientist consoles himself with the quotation from Swift's "Brobdingnag".

> "He gave it for his opinion that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of land where only one grew before, would deserve better of mankind and do more essential service to his country, than the whole race of politicians put together."

## THE PSYCHOGENIC ASPECT OF DERMATOLOGIC THERAPY*

**D. E. H. Cleveland, M.D.**

*Vancouver, B.C.*

I SHALL in the few remarks that follow endeavour to suggest a rational approach to dermatologic therapy in which special consideration is given to psychogenic factors in etiology. Few will question that such factors must be given full weight in determining the origin and nature of many skin diseases. It is often necessary to seek them out, to assess their value and in the therapeutic approach try to deal with them, in the hope that by removing or controlling etiologic factors of whatever

* Original Title selected by Program Committee and printed in official program "The Psychogenic Approach in the Treatment of Skin Diseases".

Read at the Eightieth Annual Meeting of the Canadian Medical Association, Section of Dermatology, Saskatoon, June 16, 1949.

kind nothing is neglected that may contribute toward alleviating distress.

In dermatology, as in all other fields of practical medical endeavour, we must never lose sight of the fact that the patient who seeks our aid is an individual fellow-human. He is not merely a case of eczema or psoriasis, but a person who is suffering from a symptom-complex which we denominate as such-and-such. He is not, like a Ford car or an Ingersoll watch, an assemblage of standardized, interchangeable and replaceable parts. There is something more to him than a set of physico-chemical entities reacting in accordance with invariable laws; there is also in him a psyche, personality, soul or whatever you choose to call it, which constantly introduces unknown sets of variables. Although Wordsworth did call a woman a machine, he nevertheless admitted that he saw a soul in her. Were this not so the practice of medicine, instead of being the art which it is, would be a mechanical performance hardly dissimilar from that of an automatic stoker.

In the past we have in a vague way recognized this. We knew that Dr. A. succeeded with his patients because he had a smooth "bedside manner" while in our hearts we may have known that his scientific knowledge and attainments were beneath contempt; while Dr. B., trained to a fine edge, never was a successful clinician. We saw patients drift away from those who appeared to be capable men into the hands of cultists, charlatans and quacks, where they found help. The "personal touch" must count for something. Then we began to hear about psychosomatic medicine. What else was this but what we had partially known all along, and many of our successful confrères had practised: medicine that took into account not only the soma but the psyche? Now it has become practical and rational, hence respectable.

Of all the organs of his body it is the skin which most constantly occupies the forefront of man's consciousness. It is his chief and only indispensable intermediary between that consciousness and the outside world. It is constantly exposed to his own observation. The workings of its physiology and its pathological reactions are not concealed from him, although not rarely are they a mystery both to him and his professional attendants. Not only does he observe as on a screen the way in which the skin reacts to chemical and physical influences, but he sees various phenomena which cannot be accounted for by material causes, and which he says are due to "nerves".

It is the task of the dermatologist in many situations with which he is confronted to recognize what part of the symptom-complex before him is to be accounted for by what the patient calls "nerves" but which the clinician more precisely will call emotional or psychogenic influences. Stokes and Beerman, in so many writings scattered over so many years that it is impossible to list specific references here, have emphasized the importance of the psychogenic factor in a wide variety of dermatologic disorders, and have rendered inestimable service in drawing attention to this important element in diagnosis and treatment. Sulzberger and his associates[1] have maintained an effective counterbalance against uncritical assumptions of emotional bases for skin disorders and carrying implications to an unjustifiable degree. They have warned that "there is great danger in attributing to preponderantly psychogenic causes dermatologic diseases which are in reality primarily due to other mechanisms. The physician may easily delude himself that whatever disease he cannot speedily diagnose and remedy by other means must be due to the mind and the emotions".

A stumbling block for the conscientious student has been the difficulty in accounting for the way in which emotional causes may produce physiologic reactions and pathological change in the skin. What is the mechanism and where is the link which joins psyche and soma?

Brunner[2] of the University of Illinois has recently presented this subject in the most lucid and concise manner, and for proper orientation I recommend careful study of his paper. The rôle of the sympathetic division of the autonomic nervous system in producing skin phenomena by the liberation of epinephrin-like substance at its terminals, and of the parasympathetic by its corresponding release of acetylcholine is described. These nervous discharges are initiated in the cortex and thalamus with which the higher centres of the autonomic nervous system are in intimate physiologic relationship through the hypothalamus. The normal skin reactions to these neuro-chemical stimuli are transient and are resolved when normal somatic response takes place. Inhibition of this response, from various

reasons, may result in persistence of the skin reaction. If such frustration is repeated or long continued, summation results in disordered function. Disordered function may in turn prepare the ground for organic changes produced by surface-acting chemical agencies derived from infection, allergic reactions, deficiency states and primary chemical or mechanical injury. Instances are seen in the predisposition to mycotic infection furnished by the sweaty foot, or the favourable condition for scratch-trauma and infection produced by chronic hyperæmia, of emotional origin.

The pendulum has swung far from the former view which credited allergic and other chemical or mechanical factors with full responsibility in several conditions. Today the term "neurodermatitis" is encountered with quite unjustifiable frequency. This label is used too often merely to provide an easy "out". It stamps a mark of finality on the diagnosis, obviates further thinking and study and condones a facile resort to prolonged periods of inactivity, even bed-rest, and sedation. The counsels of perfection which accompany it are usually as practical as advising the London slavey with sniffles and housemaids' knee to take to a diet of chicken and port and a holiday on the Riviera.

One has but to consult almost any standard text and read but a few issues of the current literature to find that the term has free circulation in the best dermatologic society. It is a commonly accepted synonym for atopic eczema. According to the revised version of the scriptures there are two sorts of neurodermatitis: circumscribed neurodermatitis, which Vidal denominated chronic simple lichenification, and disseminated neurodermatitis, which is atopic dermatitis, or eczema.

This can but mean that the only difference between them is the greater number of lesions and wider distribution in the latter. Both, we are to understand, are psychogenic or functional in origin; we can forget about allergy and local physical or chemical trauma, and concentrate our therapeutic approach on emotional factors. True, in one group acute inflammation, œdema, vesiculation, exudation and crusting are common factors, while in the circumscribed form these do not appear. In one group there is no significant sex preponderance, while in the other the incidence is preponderating in females, and nuchal involvement is the sole objective sign in most women, while it is almost unknown in the male. In one the eruption almost invariably makes its first appearance in early adult life, being unknown in children and rarely accompanied by evidence of allergy in other organs, whereas what is now called disseminated neurodermatitis rarely fails to make its first appearance in infancy, and is commonly accompanied by or gives place to hay-fever, asthma, migraine or other allergic diseases in later years.

These distinctions are apparently without significance. The disease is neurodermatitis.

These grievous maladies are common in the experience of all dermatologists but I suspect that the term neurodermatitis as commonly and exclusively applied to them is a signal of defeat or therapeutic despair. Many of us have perhaps had the good fortune to be able to follow throughout infancy, childhood, adolescence, and even into adult life, patients with eczema. We know the family history, in which asthma, hay-fever and eczema have figured largely. We have seen the child or adolescent who reacted sharply to identified ingesta or environmental contacts become partially or completely inactive to the same allergens as years went by, sometimes beginning to react to allergens previously unproductive of reaction. We have seen them come back to our consulting rooms, sometimes after years of absence, during which they have been able to carry on with little trouble, or with occasional resort to some simple remedies which we have previously prescribed. We learn that the acute or subacute flare which compelled the return is due to a new set of contacts, the riding-school, occupational contacts, even rarely a new article of diet. Frequently it may be traced to scholastic or amorous competition. We learn to expect the regular return of some of these young people around examination time, or recognize that each return signals a new love-affair. Thus we appreciate that, while it is the same old patient, with the same old allergic background, or "exudative diathesis" as our predecessors called it, it now may be an emotional episode that has set off the explosion. Call it now neurodermatitis if you like, but it is none the less eczema, and if you forget that, your treatment may fail because you have failed to look, and, therefore, may have missed some perfectly obvious contact allergen.

All of this and more has been admirably summed up by Stokes and Beerman[3] when they say that "the sole-cause attitude of minds towards the etiology of various skin diseases must ultimately give way to a viewpoint which recognizes multiple causation and inter-relations as equally fundamental with, if not more fundamental than, the single isolated cause. The psyche rarely appears in dermatoses as a sole cause".

Phenomena similar to those just mentioned are witnessed in a number of other skin diseases, notably the inflammatory diseases, most of them known or suspected to have important allergic implications, such as urticaria, psoriasis herpetiformis, lichen planus and herpes simplex, to mention a few at random. Weiss and English[4] have drawn attention to the "high incidence of neurosis among allergic individuals, so high indeed, that we must pay particular attention to the personality of allergic patients to see whether we cannot find psychic factors that are fundamentally important in the background of the illness and also important from the standpoint of precipitating attacks". They also comment on the high frequency of psychogenic elements in the cause of urticarial eruptions — "tension make-up, neuroticism, the worry habit, shocks, family troubles and finances". The personality type lies behind this "rather than in external impinging circumstances".

Saul[5] enunciates as the general theory of the mechanism of emotional factors in allergy that the central emotion related to the symptom is a strong longing for the love of the infantile, dependent kind which the child has for its mother. When this longing is intensified, frustrated or threatened, allergic sensitivity is increased and symptoms are produced. Thus the emotional state leads to physiologic changes which either (1) initiate allergic symptoms, or (2) render tissues more sensitive to allergens or (3) both.

In making therapeutic application of these concepts they should be introduced to the patient in such a way as to enlist his sympathetic co-operation born of insight. To accomplish this, history-taking and examination are important preliminaries. In the history-taking special attention should be paid to the behaviour of the patient rather than to the actual words in which he voices his complaints. Then, while the patient is encouraged to talk at random, a certain subtle guidance can cautiously be exercised. The conversation should veer away from symptoms to personal affairs, and the patient is led to talk about himself as a person rather than a medical case. If his feelings and views are freely aired the attentive physician is helped and the patient reassured. This conversation itself may be regarded as a form of therapy. The observer, not too obviously the note-taker, gives attention to what the patient says about himself as much as to what he says about his symptoms. This will allow a broader appraisal of the patient's personality. Whether a mild personality disorder exists or a severe one is exhibited may be learned in the course of this sitting.

Complete physical examination must be carried out, with laboratory and other tests which may be indicated. Many dermatologists, including the writer, prefer to reverse the order of history-taking and examination. This avoids the red herrings which the patient's story may drag across the trail. The first approach to the patient is "Where is the trouble?", leading him to indicate the site of his eruption, or in case none is visible he will tell you that there is discomfort in his skin. Having made the necessary examinations the history-taking may then follow. If the patient attempts to launch off on a long subjective account of his trouble this should be by all means permitted, but need not distract the examiner if some such remark as "Let me look first, then you can tell me all about it, and then I will know what you are talking about" is made. It is a rare patient to whom the logic of this will not appeal.

The essential patient-physician relationship is thus established and confidence develops in the patient. There is no more common complaint heard from patients than "The other doctor didn't examine me thoroughly . . . he didn't seem interested . . . he was too busy to listen to me"; evidence that the doctor has failed to establish confidence. The patient can forgive the doctor for failing in his therapeutic effort, but he will not forgive him for not trying. It recalls Sir William Osler's warning to students "I can forgive you for not seeing, but I cannot forgive you for not looking".

After that it is not so difficult to assure the patient that there is no physical disease present or that his symptoms are disproportionate to his actual physical disease. Take time and trouble

to explain how physical changes may be evoked by emotional disturbance; blushing or sudden pallor, gooseflesh, lachrymation, palpitation, urinary urgency or diarrhœa are useful examples to cite.

When the patient can be brought to appreciate the manner in which his troubles are wholly or in part caused by emotional disturbance the question of the use of drugs arises. Their employment is not always to be condemned even where it is found that the original disturbance arises entirely in the emotional field. In urticaria, for instance, to cite a single example out of many such, a healthy young man was being plagued by the interference of his fiancée's numerous family, who never desisted from their efforts to press upon the young couple unasked advice on every detail of their pre-nuptial life and post-nuptial plans, until the engagement almost terminated and hives plagued him night and day. Thorough examination appeared to exclude physical factors, with the exception of heat. He was a stevedore, and the most intense urticarial reaction was always evoked by the violent exertions and sweating caused by his work. A full discussion of the situation with an explanation of the mechanism which produced his symptoms followed. It was further explained that while re-arrangement of the quasi-domestic environment, as well as an emotional readjustment was in progress, an attempt would be made to give him some quick relief by medication. As in many cases of urticaria in which emotional factors predominate the anti-histamine agents were ineffective, but daily intravenous injections of calcium thiosulphate, such as are in my experience found to be of very great value in numerous cases of allergic reactions with important emotional disturbance, gave so much relief in a few days that he was able to continue his laborious occupation with little or no distress, while at the same time he acquired an increased measure of assurance which enabled him to deal with the emotional side of the picture successfully.

Drugs, whether topically, orally or parenterally administered, should not be used however in such cases unless the patient understands that they are only palliative and are not getting at the seat of his troubles. It is as bad to let the patient get the idea that having been told that his trouble originated mainly or entirely in the psychic sphere, you are now attacking some physical condition with your drugs, as it is to tell him that his troubles are imaginary. In either case you will destroy any confidence which you may have established. A period of bed-rest, unless physical rest is actually demanded for other reasons, with sedation by bromides or barbiturates in the mild personality disorders is an easy way to lose the patient's confidence. It is often helpful when the patient has been brought to understand that his ailment is not wholly, or but partially, organic in origin if he is urged to carry on in spite of symptoms. All the better if he can be helped temporarily by some such palliative, as has been suggested. Stokes' "D.G.A.D." attitude of mind if successfully inculcated will often be of much help.

Weiss[6] defines psychotherapy as "an effort to understand the personality structure of patients, the mental mechanisms at work and the specific relationships of psychologic situations in the precipitation of an illness". Simple reassurance is seldom adequate, its results are temporary at best, and there is a call for constant repetition. The same may be said of environmental adjustment unless the attempt is made to give the patient some insight into his conflicts and how they give rise to his symptoms. Such superficial forms of therapy as may be practised by the dermatologist consist essentially in a process of re-education which can lead to such a degree of emotional development that the necessity of a cutaneous outlet for emotional expression ceases.

It may not be amiss at this point to repeat that just how important a rôle the psyche plays in the production of skin disease is still a matter for much discussion. "While most authorities believe that emotional factors may aggravate or contribute to a skin eruption produced by other processes, they feel that a direct cause and effect relationship between the psyche and skin lesions has not been conclusively demonstrated."[7] It is impossible to outline dogmatically any line of procedure to be followed in all cases. Simple reassurance, as has been remarked, is seldom adequate; dealing with the true psychoneurotic by the employment of so-called "common sense" is as vague as the term itself and does no good. One must recognize the limitations of superficial or minor psychotherapy such as may be learned and practised by the dermatologist,

and know that the true psychoneurotic urgently demands the skill and experience and special techniques of the psychiatric specialist. In the simpler cases of emotional and personality disorders which do not yield to minor psychotherapy and the dermatologic disorder continues or becomes persistently relapsing, yielding to no ordinary dermatologic therapeutic measures, the psychiatrist will be a valuable consultant. He will assist the dermatologist in selecting and developing the lines of approach which he may learn to use successfully.

In the more profound disorders, such as only the trained psychiatrist can deal with, major measures such as shock therapy and pre-frontal lobotomy have been proposed. My experience in observing the results of these on the skin is too limited to permit more than a passing comment. A young paranoiac who has been observed at intervals for over twenty years frequently suffered from severe and extensive urticaria. Shock therapy tried some years ago did not produce any striking immediate results but her cutaneous symptoms have gradually ameliorated very much. More recently a patient with an extremely poor background, represented by a chequered career, which at times narrowly missed being a striped one, came under treatment for a generalized eczematous dermatitis of a seborrhœal character. She cleared up and relapsed several times during a period of years, while her emotional status became increasingly unstable rendering her a very refractory patient. Finally a pre-frontal lobotomy was performed, following which her psychological improvement was for a time striking, and the cutaneous improvement did not lag far behind. Whereas she previously had been constantly querulous, morose and lachrymose she now exhibited a state of hebetude. This passed on at times to a state of euphoria when she was almost as much a nuisance on the ward as before. Her skin eruption is far from complete recovery, but she says "If it itches me I lets it itch". Thus the traumatic and infective element in the skin is almost inactive, with corresponding improvement.

An attempt has been made to indicate very superficially the general therapeutic approach which should be attempted in skin diseases in which psychogenic factors are discoverable. No reference has been made to such matters as malingering, self-mutilation, dermatitis artefacta, acarophobia and other evidences of more or less serious personality or psychic disorders, for in most of these the dermatosis is actually an episode occurring in such disorders, and they nearly always can only be dealt with successfully if at all by a psychiatrist.

REFERENCES

1. SULZBERGER, M. B. AND ZAIDANS, S. H.: *M. Clin. North America*, **32**: 669, 1948. (Abstr. *Y. B. Derm. & Syph.*, 1948.)
2. BRUNNER, M. G.: *Arch. Dermat. & Syph.*, **57**: 374, 1948.
3. STOKES, H. H. AND BEERMAN, H.: *Psychosom. Med.*, **2**: 22, 1940.
4. WEISS, E. AND ENGLISH, O. S.: Psychosomatic Medicine, W. B. Saunders Co., Philadelphia and London, 1943.
5. SAUL, L. J.: *Psychosom. Med.*, **3**: 66, 1941.
6. WEISS, E.: *J. A. M. A.*, **136**: 442, 1948.
7. *Idem*: *Bull. New York Acad. Med.*, **23**: 604, 1947.

603-606 Medical-Dental Bldg.

RÉSUMÉ

L'auteur donne les idées nouvelles sur la thérapeutique des lésions dermatologiques psychogéniques. En dermatologie comme dans les autres branches de la médecine il faut tenir compte de la personnalité du patient et non pas seulement de la lésion. La peau est constamment un objet d'examen que ce soit par le patient lui-même ou par les autres. Le plus difficile dans le diagnostic d'une lésion de la peau est de faire la part des éléments organiques et psychiques. Peut-être que les facteurs psychiques ne feraient que préparer un terrain propice à l'épanouissement de la lésion dermatologiques et non pas toute la lésion elle-même. L'auteur déplore que l'on pose le diagnostic de neurodermite avec tant de facilité afin de se sortir du pétrin. On peut diviser ces états en neurodermite circonscrite et neurodermite disséminée ou dermite atopique. L'auteur décrit ensuite les lésions trouvées dans ces états. De plus en plus on est porté à considérer ces lésions comme des maladies mixtes où les inter-relations sont fréquentes. Rarement on aura des facteurs psychiques comme cause uniques.

Avant de fournir des médicaments au patient il faut lui expliquer comment des émotions peuvent causer des lésions sur la peau, p.e.q. sans cela le patient lorsqu'il sera soulagé par les médicaments ne croira plus à ses facteurs psychiques. Les médicaments doivent être des palliatifs et non pas la cause de la guérison. La psychothérapie est avant tout le traitement de choix. Quelquefois il rencontrera des problèmes émotifs au dessus de ses connaissances c'est alors qu'il devra faire appel au psychiâtre.

YVES PRÉVOST

---

INSPECTION OF COARCTATION OF AORTA WITH A THORACOSCOPE.—A 31-year old female patient was found to have many of the features of coarctation of the aorta. To confirm the diagnosis and to determine whether the patient should be operated on, artificial pneumothorax was performed on the left hemi-thorax on three occasions, and then thoracoscopy was carried out by a Jacobeus thoracoscope in the fourth intercostal space at the anterior axillary line. The lung was seen to be collapsed and a huge subclavian artery noted, into which the arch of the aorta seemed to terminate. The internal mammary artery and the upper three intercostal arteries were seen to be about three times their ordinary size. The descending portion of the aorta could not be seen, but the stricture appeared to be just beyond the origin of the left subclavian artery. The patient suffered no ill effects from this procedure and the lung expanded in a few days.—Money, R. A.: *Brit. M. J.*, 4640: 1352, 1949.

# THE PSYCHOGENIC FACTOR IN ASTHMA*

**H. K. Detweiler, M.D.**

*Toronto, Ont.*

AS Weiss[1] has stated, "When a person gets sick, he is sick all over". The medical practitioner who concentrates his whole attention upon the physical aspects of the patient's condition will fail in many instances to obtain maximum results in treatment. This applies with equal force to physician and surgeon, to general practitioner and specialist. We must all of us keep in mind the psychosomatic point of view, which is that the psyche appears as one of the several factors which, acting together, produce the clinical condition we are attempting to cure.

We hear so much in recent years about psychosomatic medicine that many of the younger practitioners are apt to think that it is a new concept in the realm of medicine. But is it really new? As Karnosh[2] put it, much of it is merely "new cackling over an old egg". For a long time physicians have recognized that the mental state of a patient profoundly influences the various manifestations of many diseases. It is recognized by all good clinicians that the physician who attempts to treat a patient suffering from peptic ulcer with diet and alkalis, and who pays no attention to the detrimental effects of worries and conflicts in home, office or factory, the financial or sociological problems of the family and the effects of fatigue and chronic illness upon the patient's powers of resistance, will achieve little. However, in the field of allergy, the discoveries during the past thirty years of the dramatic effects of atopic and other forms of hypersensitiveness have so occupied the foreground that other important but less sensational factors have received scant attention. This is true in other fields as well, and accounts, at least in part, for the current interest in the subject under discussion today.

The relative importance of the psychogenic factor naturally varies from case to case. It is obvious to all that an individual suddenly stricken with acute lobar pneumonia will require less attention from the psychosomatic standpoint than one suffering from idiopathic ulcerative colitis. Similarly in some allergic disorders, as for example in pollen hayfever, a single factor may be largely responsible. In most cases of asthma, however, the pathogenesis is anything but simple, and numerous factors of varying importance are involved. Chief among these are nervous and psychic instabilities, and failure to take this fact into account will limit markedly the success one achieves in treatment.

I do not remember ever seeing an asthmatic who was not what is commonly spoken of as "high-strung". Some will say "Why shouldn't he be nervous after all he has suffered?" This attitude suggests that the nervous condition is secondary to the asthma and not a causative factor. That view may have some justification since it is a matter of common observation that any debilitating disease has a deleterious effect upon the nervous system. But if a careful history is taken, it will be found that in most if not all cases, the fundamental nervous make-up was such as to predispose the patient to respond in a characteristic manner to the underlying allergic state and to augment and intensify the asthmatic outbursts initiated by absorption of the allergen. A careful history will include inquiry into heredity, evidence of childhood neurosis, sensitivity to specific emotional factors, especially at epochal life periods (puberty, marriage, childbirth, climacteric, etc.) and specific behaviour to stressful conditions. Evidences of autonomic nervous imbalance, such as cold clammy hands and feet, mottled skin, hypotension, excessive sweating, tachycardia and gastrointestinal irregularities are frequently uncovered in the history and physical examination.

In placing this emphasis upon the psychosomatic aspects of asthma, I do not mean to suggest that the influence of allergic and physical factors is of minor importance. Quite the contrary. If these factors are neglected or decried, one may readily render an otherwise most careful etiologic and therapeutic approach of little value.

So far as allergy is concerned, the fact that the removal or avoidance of an allergen, or a hyposensitization regimen, "cures" the patient, proves only that one important factor has been removed and the morbid chain of events has been interrupted. Exactly the same reasoning can be applied to psychological factors.

It has been said that the heart is the seat of the emotions, but the fact is that the respiratory

* From the Department of Medicine, University of Toronto and the Toronto Western Hospital.

Read before the Canadian Medical Association, Section of Medicine, Saskatoon, June 15, 1949.

function is at least equally affected. If we are startled we "catch our breath", and when we are depressed, we complain of a feeling of smothering. We are all familiar with the sighing of sadness, the rapid breathing of excitement and anticipation, and the expansion of the chest with joy. We speak of a person as having a "load on his chest" and many patients suffering from an anxiety state complain of shortness of breath which on analysis proves to be a series of sighs. Some of these symptoms, as Weiss points out, will be recognized as the symbolic expression of tension, or to put it another way, when people are unable to act or unable to speak about their problem, the body takes over the function of answering that problem in its own way.

The examples just cited are, of course, not instances of asthma, but some of them must be differentiated from it, and the mechanisms involved are often operative in the true asthmatic. Neurotic trends in asthma have long been recognized but, as stated before, very often they have been considered to be due to the disease rather than to be causally related to it. How often we see an asthmatic patient lying or sitting quietly in bed without distress until they become aware of our presence, when they begin immediately to heave and wheeze with typical asthmatic breathing. And this dyspnœa is promptly relieved by appropriate treatment such as a dose of epinephrin given hypodermically. It will be said that in this case the patient is making the most of his condition by drawing attention to himself and disturbing those around him to the utmost. While this may be true, it is, I think, not to be credited as fundamentally responsible, but rather as a secondary gain. The psychological factors probably lie far deeper in the unconscious mental life and will be revealed only after patient study.

This brings us to the question: are psychogenic factors sometimes the sole cause of asthma? This is a difficult question to answer unequivocally. It seems to me that in most if not all of our asthmatics, we will find on diligent search an underlying allergic state, be it atopic as in pollen asthma, for example, or bacterial as in infective or bronchitic asthma. It would appear that in most, if not all, there must first be present a *capacity* for bronchial spasm, either inherited or acquired, which must be present before the psychogenic impulses will result in an asthmatic attack. How else can we account for the fact that many individuals have repeated attacks of respiratory infection without ever becoming asthmatic? How else can we account for the many neurotic individuals whose emotional disturbances take any form but an attack of asthma? I am quite ready to admit that in some instances of asthma evidence of a previous allergic state is inconclusive or indeed nonexistent, but these instances are rare.

I have elsewhere[3] spoken of certain nonspecific asthmogenic factors as "trigger pullers" inasmuch as the patient with the asthmatic capacity is like a loaded gun with various stimuli pulling the trigger and causing the gun to fire (asthmatic attack). It would seem to me that the rôle played by the psychic factors is of the nature of such a non-specific stimulus in an already sensitized patient. Following is a list of the more common trigger pullers:

TABLE I.

IMMEDIATE PRECIPITATING FACTORS IN ASTHMA "TRIGGER PULLERS"

1. Excitement, emotional upsets, etc.
2. Exposure to frosty air; "night air".
3. Exertion; coughing; hearty laughing.
4. Exposure to dust; fumes; strong odours.
5. Fatigue; "depletion".
6. Hearty meals (a full stomach).
7. Horizontal position (as in bed).
8. Respiratory infections; "catching cold".

As this is being written, I have two patients in hospital who illustrate some of the psychological problems so characteristic of many cases of asthma.

Mrs. G., aged 42, was admitted suffering from severe attacks of asthma. She has had a number of attacks during the past few years, in all instances seemingly initiated by a fresh respiratory infection centering in the tracheobronchial tree. The previous attacks had responded to the usual treatment quite promptly, but on the present occasion such treatment has afforded very little relief. Her cough (mostly nonproductive) occurs in protracted spells and at first was thought to be an "asthmatic equivalent" but failed to be relieved by suitable measures such as epinephrin, ephedrin, or aminophyllin. When she is not coughing she has an annoying habit of clearing her throat at frequent intervals which after long observation one can only put down to nervous irritability.

She has a special nurse who is on duty from 8.00 a.m. to 4.00 p.m. As the time approaches for this nurse to go off duty and the patient to be left to the intermittent attention of the "floor" nurses, a state bordering on panic ensues for no other apparent reason than that she will be left alone. Her asthma begins at this time and is controlled with great difficulty. Whenever the subject of her returning to her home is broached she becomes worse although she professes a great desire to go home. Her mother lives with her and her husband and is a source of great anxiety to the patient because of her advanced age and infirmities. It is apparent that the patient realized that if she went home she could not

cope with the care of the household and her mother, and they have no help in the house. Obviously some way must be found for the care of the mother outside the household.

The other case is that of a girl of 15 attending a boarding school in the city. She has been subject to periodic attacks of asthma since early childhood, apparently initiated by chronic paranasal sinusitis and subsequent bronchitis. Many of her attacks can be traced directly to emotional upsets. She is the child of divorced parents and makes her home with her mother who regards her as a problem child. She has been placed in various boarding schools where unsatisfactory developments have necessitated transfer to new schools in the hope that a fresh start might be made and the past forgotten. There is apparently no real home life and parental love and affection so essential to all children and especially so to a child of this type. She lacks a feeling of security. She has become wilful and obstinate and tends to resent authority. The lack of sympathetic co-operation of the mother with the school authorities and the physician seriously hampers her treatment. At the present time she seems happy at the school and during her stay in hospital surrounded as she is with sympathetic care of nurses and physician her progress has been good. Her one anxiety is that she will be taken from the school and returned to her home.

It was indicated earlier in this paper that the emotional factor in asthma is probably supplemental to an allergic state. There are some who feel that this is only begging the question. The same facts apply to every pathological condition of specific origin that can be conceived. As Pusey[4] says "these predisposing factors in themselves are not the cause of the disease. You may emphasize them and elaborate them. You may indulge in all kinds of intellectual and physical gymnastics, but they alone are impotent; without the definite specific cause disease does not occur." Pusey was referring to so-called neurodermatitis, but his remarks are equally applicable to asthma.

What, then, should we do in the management of asthma? It seems obvious to me that the investigation of each case should begin with the taking of a careful history which should take into account all the features which suggest a possible clue to the fundamental allergic state of the individual. It should at the same time pay the fullest attention to the nature and origin of those psychological factors which surround, obscure and activate the basic allergic state. The hereditary influences, both allergic and psychologic, must not be neglected. This history is then supplemented by the physical examination and laboratory procedures including skin testing, etc., but it must also be supplemented by a meticulous appraisal of the immediate precipitating factors in each asthmatic attack during a period of observation. Prominent among these trigger pullers will be found emotional states, and failure to recognize these states and to take steps to correct them will result in partial or total failure to relieve the asthma.

In the majority of cases, the family physician is in the best position to undertake the task. He best knows the psychological background of the asthmatic sufferer. He knows the domestic and family relations and is familiar with the problems in the home. He is in the patient's confidence and if he is possessed of an understanding heart and an appreciation of the importance of psychotherapy in these cases and if he is prepared to spend the necessary time he will rarely find it essential to appeal to a psychiatrist for help.

In stressing the importance of the psychotherapeutic approach to the problem of asthma, it may perhaps seem that the conventional investigation and treatment of the condition has been relegated to a minor rôle. This is not the case. The importance of atopic and bacterial allergy and their appropriate investigation and treatment is as fundamental as ever. They have been stressed in other communications and the emphasis on the psychosomatic approach in this paper must be taken in its proper relation to the problem as a whole.

## SUMMARY

Attention is called to the importance of recognizing the psychosomatic element in asthma. Without wishing in any way to detract from the importance of studying the asthmatic patient from the conventional standpoint of allergy both atopic and bacterial, a plea is made to practitioners to pay special attention to the psychological background and the influence of emotional states upon the initiation of asthmatic attacks. Emphasis is placed upon the prime importance of a searching history from both the allergic and psychosomatic standpoints. Treatment based on a complete investigation of each individual case will of necessity include psychotherapy in its broad aspects, and will result in maximum benefit to the patient in this dread disease.

## REFERENCES

1. WEISS, E.: *Bull. New York Acad. Med.*, p. 604, November, 1947.
2. KARNOSH, L. J.: *Psychiatric Quart.*, **18**: 618, 1944.
3. DETWEILER, H. K.: *Canad. M. A. J.*, **56**: 392, 1947.
4. Quoted by Weiss *ibid.*

1007 Medical Arts Bldg.

# PROVISIONS FOR THE PREVENTION AND CARE OF TUBERCULOSIS IN CANADA*

**R. G. Ferguson, M.D.**

*Fort San, Sask.*

APART from the native Eskimos and Indians, concerning whom we had no statistics, the tuberculosis death-rate in Canada in 1900 was 200 per 100,000 population, in 1947 the death-rate from tuberculosis in the same group was 38 per 100,000 population. Including the natives the death-rate was 43.4. In 1900 there were less than 100 sanatorium beds available for treatment, today we have 15,980 beds available, or 2.9 beds per death, and we are clamoring for 3,000 more beds, so that there will be no waiting list, no one denied the right to a cure. The statistical results are very encouraging. Its human losses we still hesitate to contemplate: in 1947 we had 5,499 deaths from this preventable disease.

Considering the progress in the last two generations, as the problem of prevention and care of tuberculosis appears in Canada today, the tide of battle has turned and the time is opportune for an eradication drive. The enemy is resourceful and still deeply entrenched, the advance will be difficult and it will require great resources, hard work and an indomitable courage. The campaign will be prolonged one or two generations depending on the present death-rate, which varies considerably in different provinces. Such a sustained effort requires confidence, steadiness, research, experimentation, a thoroughly informed public and a united effort backed by local, provincial and federal support.

## EDUCATION

In a health effort of such magnitude the first provision is public health education with a view to making the people tuberculosis-conscious, to creating a state of enlightenment in which the people without phthisiophobia are familiar with the extent of the disease, its early symptoms and spread, so that they may know how to avoid it and deal with it with equal intelligence to the end that generations to come will largely escape infection. The delusion has been dispelled that it is hereditary, the fallacy disproved that the disease is inevitable, the conviction formed that the disease can be prevented, and the fact widely accepted that when contracted it can be cured if discovered early and treated efficiently. However, our greatest asset in Canada is the vision of the common people of a nation rid of this needless plague. By free treatment, generous provision for prevention and voluntary co-operation they declare their willingness to pay the price.

Tuberculosis education in Canada is carried on throughout the entire year by all authorities participating, the Federal health department, the provincial departments of health and education and the municipal departments of cities and towns. Splendid schools of hygiene and public health are available. Undergraduate and affiliate training for nurses and undergraduate training for doctors is progressing steadily. The medical profession, nurses and other health workers are being trained and equipped to give leadership and supervision. All this public health effort is supplemented by a special educational campaign for fund raising through the sale of Christmas seals. This effort is co-ordinated by the Canadian Tuberculosis Association and initiated by national broadcasts and publicity. Thereafter it is carried through to conclusion by provincial tuberculosis associations, assisted by numerous organizations, the radio, press, Associated Canadian Travellers, teachers, clergy, Imperial Order Daughters of the Empire, and others. Funds raised by sale of seals, now twelve cents per capita, providing a total of one and one-half million dollars in 1948, with few exceptions are used for preventive work. To this may now be added the federal tuberculosis grant of $3,000,000, thus providing (in addition to free treatment) over four million dollars per annum for the prevention of the disease, an amount equal to one-third the cost of free treatment.

## RESISTANCE AGAINST THE DISEASE

The standard of living supported by family allowances, old age pensions and general prosperity is now at a relatively high level in the country. A high standard of nutrition, better housing, more rest is akin to modified sanatorium treatment. Newfoundland has led the way in investigating dietary deficiencies and providing remedies supported by a province-wide educational campaign. Adequate nutrition increases natural resistance to small infections, favours healing and reduces morbidity from tuberculosis.

* Read before the British Commonwealth Conference, Saskatoon, June 8, 1949.

It is, however, a limited factor in eradication and cannot protect the susceptible margin against large and frequent infections whether in families or highly tuberculized environments. This limitation of adequate nutrition in protecting the susceptible margin is evident from breakdowns among healthy, well nourished nurses caring for the sick in hospitals and sanatoria.

*Vaccination of unavoidably exposed.*—Experience with BCG vaccination in Canada indicates that it will confer worthwhile protection against first infection with tuberculosis, reducing the lesion ratio to its fourth among tuberculin-negative nurses and attendants in hospitals, thus reducing the incidence in this group to the level of those tuberculin-positive and x-ray negative on entering the environment. Likewise, among native Indian infants vaccination at birth reduced both the lesion rate and the death-rate to better than its fourth compared with non-vaccinated controls. The experience in Saskatchewan covers the period of infancy, childhood and adolescence, and average period of observation was six years. While BCG vaccination is a limited factor in a program, it is a valuable adjunct for the protection of unavoidably exposed tuberculin-negative nurses and attendants in hospitals and sanatoria, as well as for infants and children born in contact families or highly tuberculized communities, or more susceptible racial groups. The added protection conferred by vaccination is another barrier, a higher threshold of resistance, and when it can be secured without the hazard of a potential focus of virulent infection it becomes increasingly attractive.

The Province of Quebec has led the way in prophylactic vaccination in Canada. This province is proceeding to vaccinate infants at birth, negative reactors in contact families and school children in highly tuberculized areas. Vaccination with BCG is now being used in practically all sanatoria and many schools of nursing in Canada. Its use has resulted, in Saskatchewan, in reducing the hazard of tuberculosis among nurses and attendants in the three sanatoria to the incidence where they are now insurable risks for disability from sickness and accident at minimum rates, and for group life insurance at experience rates. The reduction of the hazard of tuberculosis among nurses has also made possible an arrangement with the schools of nursing in the province for affiliate training in tuberculosis at the Fort Qu'Appelle Sanatorium. A plan for vaccination of tuberculin-negative members of contact families is proceeding steadily in Saskatchewan. Furthermore, the Department of Indian Affairs of the Federal Government has instituted a BCG vaccination program throughout Canada for the protection of infants and children in this more susceptible racial group.

### SEGREGATION FOR TREATMENT

Segregation for treatment in tuberculosis has proved to be the greatest preventive measure; it acts quickly and is fool-proof. Segregation of patients for treatment in sanatoria, not only for restoration of function, but for closure and cure if possible, has proved to be the method most effective in eliminating infection in the general public. In 1900 there were less than 100 sanatorium beds in Canada, today there are more than 15,000, a ratio of 2.9 beds to each death. Experience has been that, other things being equal, where three or more cases are treated per death over a period of a decade the tuberculosis death-rate falls and the case rate and infection rate falls among infants, children and young adults. In Canada segregation of all active cases for treatment is the hope for success in the eradication drive. Treatment of active cases, infectious or non-infectious; closure of infectious cases, sick or not sick; affords the optimum cures and reduces spread of the disease. Active treatment should be pursued to the limit of both medical and surgical knowledge.

Promotion of construction of sanatoria for segregation and efficient treatment of the sick is part of, and proceeds hand-in-hand with, preventive education. Without beds for the care of the sick, education and early discovery would cause irritation, frustration and disappointment. In three provinces sanatorium beds are still inadequate.

In addition to provincial contributions toward sanatoria construction, the Federal Government now contributes $1,500 per bed and will agree to necessary technical laboratory and x-ray equipment being charged to the Federal tuberculosis grant. The cost of specific therapy such as streptomycin is also chargeable to this Federal grant and every facility is being given to reach the minimum standard of beds and provide the necessary equipment to make treatment efficient. Thus provincial construc-

tion aided by Federal subsidy now under way should provide adequate beds to make the program of segregation effective.

### EARLY DISCOVERY

Early discovery supported by ample facilities for diagnosis and a co-operative people, is second only to adequate segregation as a preventive measure in the eradication of tuberculosis. The foundation of early discovery is a keen and interested medical profession to whom stationary diagnostic clinics are available at strategic centres of population, and travelling clinics at intervals in sparsely settled remote areas.

All-over miniature x-ray surveys of the province or state at intervals of four years or less for the discovery of unknown spreaders is a necessary adjunct in eradication where 70% of patients have no knowledge of where they contracted the disease. Such surveys are an incident in the program, and do not replace the careful continuous observation of the physician, the diagnostic clinic and the follow-up. The by-product of such surveys is the intensive education of the people through their wide participation in eradication. It discovers some of next year's breakdowns a year ahead and contributes its quota of early cases. Radiographic screening of patients entering hospitals is now being instituted throughout Canada as a result of Federal grants; this promises to be the most economical and practical addition to the early discovery program. Where most of these case-finding facilities have been in operation for upwards of a decade the proportion of early cases discovered have increased rapidly and in some provinces constitute 40% and even 50% of all new cases. This earlier diagnosis greatly facilitates recovery and reduces the spread of the disease.

In 1948 there were 519,258 persons examined at tuberculosis clinics; in addition 1,613,496 persons were examined in miniature x-ray surveys. In the three Prairie Provinces one-quarter of the population was examined in 1948. Saskatchewan during the past seven years has screened the entire province once-over and is now half way through on the second round-up.

### PROVISION FOR THE CARE OF INDIANS

Provision for the care of Indians in Canada presents a special problem of interest. The Indians are a native race who were relatively free of tuberculosis until contacted by the white settlers. They constitute roughly 1% of the population and contribute around 12% of tuberculosis deaths. Their death-rate from tuberculosis in 1947 was 549 per 100,000 population. The burden of tuberculosis control among the Indians is therefore 12% that of the entire Canadian tuberculosis problem. With almost universal infection at age thirty and rather low standards of living owing to their stage of development, the problem is difficult.

The Department of Indian Affairs of the Federal Government is rapidly extending and assuming the cost of a prevention and care program similar to that for the white population, with more attention to vaccination and living standards, investigation of dietary deficiencies and provision of remedial measures. It should prove heartening to other Members of the Commonwealth which have similarly highly tuberculized groups, to know that notwithstanding the difficulties, wherever the program approaches the minimum standards of segregation and treatment, similar results are observed.

### BOVINE TUBERCULOSIS

Bovine tuberculosis constitutes a steadily diminishing menace in Canada. Tuberculous lesions of bovine origin, when present in the human body, are as fatal as similar lesions of human origin. Pasteurization of milk gives immediate and practical human protection. The Province of Ontario, most cities, and many large towns in Canada have pasteurization laws. The elimination of this disease among cattle gives effective protection and removes an unnecessary economic waste. Experience here is that repeated testing and elimination of the infected animals in restricted areas for the eradication of bovine tuberculosis readily reduces this disease. All provinces in Canada have restricted areas and the program is proceeding steadily. Approximately half the cattle in Canada are under supervision, including the great majority of cattle supplying milk for consumption, and the area remaining to be tested in most provinces is not highly tuberculized. Nevertheless, in an eradication program any residue of bovine tuberculosis is inexcusable and should be cleared up. Testing has been retarded recently due to limited veterinarians to carry on the work. The cost of bovine tuberculosis

testing under the restricted area plan is borne largely by the Federal Health of Animals branch and partly by the municipality benefited, compensation under the plan being paid entirely by the Federal Government.

### Case Registration and Follow-up of Ex-patients and Contacts

Case registration and follow-up of ex-patients and contacts provides information for aftercare and rehabilitation and statistical data from which to value results of treatment. The various provinces of Canada have, more or less, complete central case registration with continuous follow-up from centres in divisional zones where wide areas necessitate such subdivision. This follow-up is co-ordinated with health regions, city health departments, etc., in so far as possible. In Saskatchewan, for instances, each new active case is given a successive number and a case summary card is maintained, on which classification and brief notes are entered from year to year. At intervals of five to ten year follow-up studies are made from these cards to determine results of treatment.

### Epidemiological Studies

Epidemiological cross-section surveys have been made in several provinces. Tuberculin testing of student nurses and teachers going into training provides annually a cross-section of roughly 2% of the young adult population, aged 20 to 24. Tuberculin surveys of school children in representative areas at intervals of five years as occasion affords indicates the infection incidence in childhood. Such information when co-ordinated with morbidity and mortality is helpful in the direction of a campaign. Approved studies of this nature may be charged to the Federal Grants to the Provinces.

### Rehabilitation

Plans for rehabilitation of disabled tuberculous patients are being developed in the provinces as a result of Federal Grants. This service has long been delayed through lack of funds. The idea has been stimulated greatly by the post-war program for disabled veterans. Manitoba has led the provinces in Canada by initiating a plan in civil life upon a practical and economical basis. This takes the general form of education and light technical training during convalescence in Sanatoria, assistance in job placement on discharge, supplemented by investigation for aptitude and re-education after discharge when necessary. The Province of British Columbia has led the way in initiating grants in assistance to needy patients during treatment and for a necessary period after discharge, up to the level of an adequate standard of living. In other provinces less adequate assistance is available from various sources. One could summarize the situation by stating that plans for rehabilitation are in the formative stage and that Federal grants to assist acceptable plans are now available. Plans are now operating in five provinces, three others are taking on rehabilitation officers. The Department of Veterans' Affairs continues an excellent service for tuberculosis and other disabilities under its care.

### Conclusion

With the development of industry and the growth and shifting of population in a young country, no province is safe when a portion of it is tuberculous, and the country itself is not safe when a racial group, a city or a province is tuberculous. In Canada it has taken more than a generation in time, intensive educational effort and the stimulus of two great wars to engage the press, the radio, public bodies, communities, provinces and the Federal Government in this great humanitarian effort. We now have facilities and resources and the morale for a tremendous advance towards the eradication of this disease.

### Summary

Among Canadians in 1900 apart from the Eskimos and Indians, not then included in vital statistics, the tuberculosis death-rate was 200 per 100,000. In 1947 in the same group the tuberculosis death-rate was 38 per 100,000, and inclusive of Eskimos and Indians the tuberculosis death-rate was 43.4 per 100,000. There still were however 5,499 deaths from this preventable disease in 1947.

The standard of living supported by family allowances, old age pensions and general prosperity is now at a relatively high level in this country. The time appears opportune for an eradication drive.

Where cases are promptly admitted for treatment in the ratio of three or more per death, and active case finding practised by

physicians aided by clinics, follow-up of ex-patients and contacts, supplemented by all-over miniature x-ray surveys, within a decade the proportion of cases discovered in the early stage increases to 40% and even 50% of all new cases, and the infection incidence rapidly falls among children and young adults. In Canada in 1946 there were 1,362,221 persons examined at clinics and surveys, a ratio of 248 to each death. To the above screening program is now being added examination of patients entering hospitals. It is estimated that this will increase the number being screened by one million persons.

Segregation of patients for treatment in Sanatoria, not only for restoration of function, but for closure and cure if possible, has proved to be the method most effective in eliminating infection in the general public. In 1900 there were less than 100 sanatorium beds in Canada, today there are more than 15,000, a ratio of 2.9 beds to each death. Experience has been that, other things being equal, where three or more cases are treated per death over a period of a decade the tuberculosis death-rate falls and the case rate and infection rate falls among infants, children and young adults. In Canada segregation of all active cases for treatment is the hope for success in the eradication drive.

The protection of the unavoidably exposed, nurses in sanatoria and hospitals, Indian infants on reserves, and uninfected persons in contact families by BCG vaccination increases resistance and reduces the lesion rate in the impact of first infection to its fourth or better. Most sanatoria in Canada and many schools of nursing are now using this prophylactic. Infants and children in highly infected areas in Quebec are being vaccinated, and the Department of Indian Affairs is likewise protecting this highly tuberculized and susceptible race.

Bovine tuberculosis constitutes a steadily diminishing menace in Canada. Tuberculous lesions of bovine origin when present in the human body are as fatal as similar lesions of human origin. Pasteurization of milk gives immediate and practical human protection. The elimination of this disease among cattle gives effective protection and removes an unnecessary economic waste. One-half of the cattle in Canada are tested and under restricted area supervision.

Case registration and follow-up of ex-patients and contacts reduces relapses, prevents spread of disease, affords information for statistical study of results and provides a basis for a rehabilitation plan.

Plans for rehabilitation of disabled tuberculous patients are being developed in the provinces. Rehabilitation is in the formative stage and Federal grants to assist acceptable plans are now available. Projects are now operating in five provinces and three provinces anticipate action before the end of 1949.

An intensive educational program in schools, homes, and throughout the country, supported by the Federal, Provincial and Municipal Health Departments, supplemented by the Canadian and Provincial Tuberculosis Organizations together with the early discovery and segregation of new cases, free treatment and follow-up program, on the scale indicated above constitutes the eradication advance in Canada.

## FLUOROSIS WITH REPORT OF AN ADVANCED CASE

**Leslie G. Kilborn, M.A., M.D., Ph.D.,***
**T. S. Outerbridge, M.D.† and**
**Hai-Peng Lei, B.S., M.D.***

*Toronto, Ont.*

INTEREST in the use of sodium fluoride in attempts to decrease the incidence of dental caries should not cause us to lose sight of the dangers from larger doses of the substance. Dentists are well aware that mottling of tooth enamel results when fluorine in the drinking water exceeds one or two parts per million, provided that it is taken in childhood before the eruption of the permanent teeth. There is considerable evidence that a concentration of about one part per million in the drinking water tends to decrease dental caries, (see Volker and Bibby,[1]) and if this amount is not exceeded it is unlikely that any serious harm will result.

That a high fluorine intake, however, produces changes of a serious nature in bones and joints is now fully established. We report an

* Department of Physiology and Pharmacology, West China Union University, Chengtu, Szechwan.
† Missionaries' Memorial Hospital (English Methodist), Chaotung, Yunnan.

endemic centre of fluorosis in Southwest China, and although no such areas have been found in Canada, they should be watched for.

In 1934 one of us (L.G.K.) travelled to Shih Men K'an in Kweichow Province as a member of a party whose object was the anthropological study of the Miao and other aboriginal races. For some time we have been aware that students coming to Chengtu from that area suffered from mottled enamel, and hence suspected that the drinking water might contain an abnormally high percentage of fluorine. Three samples of water, which we took with us to Chengtu, were assayed for fluorine by H. B. Collier, who reported the following results: pond (surface water), no fluorine found; spring water, 2.4 parts per million (p.p.m.); stream water, 13.1 p.p.m. Since the latter values were well above the threshold for mottled enamel we felt that this observation merely confirmed the then recently established relationship between the incidence of mottled enamel and the fluoride concentration of the drinking water. The fluorine-free pond water was not used for human consumption.

During our anthropological studies we were puzzled by the high incidence of a peculiar type of "arthritis" and joint ankylosis that seemed to afflict a majority of the adult inhabitants of a number of small Miao villages in the neighbourhood. In fact, in many of the older people the disease had advanced to such an extent that they appeared to be "set" in semi-sitting positions, with almost complete loss of movement in the neck and back and extreme limitation of movement in the limbs. The people there informed us that all children born and brought up in these villages became affected by the time they were 17 or 18 years of age. At the time we came to no conclusion in regard to the etiology of this condition, perhaps because although all of those affected had mottled enamel large numbers of the non-affected persons also showed mottling, many of them to a marked degree.

Later a copy of Roholm's monograph on fluorine intoxication came to hand and we were struck at once by the similarity in appearance between the photographs of the Danish workers in cryolite and the crippled Miao peasants in China. Roholm[2] had demonstrated conclusively that the inhalation and absorption of cryolite dust, over half of which is fluorine, caused extensive bone and joint changes, besides many other less disabling abnormalities in other parts of the body. Motility in the spinal column became restricted, and in those exposed for the longest periods there was almost complete rigidity of the entire spine. X-ray examination revealed bone changes in 84% of all the workers in the cryolite factory, and it was seen that all bones were attacked, some more frequently than others. The pathological process was described as a diffuse osteosclerosis with pathological formation of bone starting in the periosteum and endosteum. Compact bone became denser and thicker; the trabeculæ of spongy bone thickened and fused. The medullary cavity decreased in size and ligaments became calcified.

Available literature was consulted for references to similar skeletal changes occurring spontaneously as a result of the ingestion of fluorine in food or water under natural condition. Only one such report was found, that of Shortt *et al.*[3] who reported skeletal changes in the Madras Presidency, India. Ten cases were described, with laboratory reports, and the descriptions tallied closely with that of the Danish cryolite workers. There was increased density of the bones, with "exaggeration of the trabeculation and diminution of the medullary area". Again the spine was most frequently and most seriously affected. Photographs of some of the patients were included in the report and they closely resembled both the crippled Miao and the cryolite workers in Denmark. Hence, little doubt remained as to the cause of the condition found in China. Since then other endemic centres have been reported in India, North and South Africa, South America, and sporadic cases have been observed elsewhere, including both the United States and Great Britain.

Because of the war it was impossible to undertake an expedition to Shih Men K'an in order to make a more detailed study. However, one of us (T.S.O.) was then stationed in Chaotung, Yunnan, only a short distance from the affected area, and so undertook a local investigation in March, 1942. It was found that four small villages, all drawing water from the same side of the mountain, though not from the same spring, were involved. Three of these were inhabited by Miao and one by Chinese. According to information supplied by the oldest residents Miao villages had been on or near these

sites for about 200 years, but their exact locations varied with health and crop conditions. The largest of the villages had made its last move about 38 years previously because of the prevalence of joint ankylosis, which was thought to be associated with the earlier site higher up the mountain side. Although the local explanation of the disease connected it with several potent sorcerers who had lived in the locality three generations previously, the move had been suggested by a Christian missionary, the late Sam. Pollard. The people believed that the incidence of the disease had decreased since the move. A small village, one of the four affected, still existed on the upper site. Samples of the water used by these two villages, as well as water from a natural reservoir on the hillside, were sent to Chengtu for fluorine determinations. The results, as obtained for us by D. R. Feng, were: Upper Village, 6.28 p.p.m., Lower Village, 5.93 p.p.m. and natural reservoir, 1.48 p.p.m. This slight difference between the fluorine content of the two village water supplies does not justify the villagers' belief that the lower site was the healthier. However, a house-to-house canvass of the two villages indicated that the affliction was decidedly more prevalent in the upper village. But poverty, with its accompanying malnutrition, poor housing and inadequate clothing, was also much more apparent in the upper village. In fact, there seemed to be a definite connection between the development of joint symptoms and poverty or intercurrent infections, since the disease appeared to be much more severe in those who had the least opportunity for healthy living. A similar opinion has been expressed by Pundit *et al.*[4] in regard to endemic fluorosis in India.

The villagers asserted that the usual onset of the disease occurred at about the age of 10 years or in the early 'teens, and started with a fever during which the patient complained of coldness and numbness. Then more or less gradually stiffness developed in various joints and the patient became a hunchback and a cripple. In the most acute cases death occurred at about 18, but if the disease became chronic the patient often lived to be 50. Another point noted was that pigs were the only domestic animals which developed any disease which the villagers connected with the human condition. They were the only animals which shared a common water supply with their human masters. Cows, goats, sheep, horses and dogs all got their water from surface ponds and showed no signs of any similar disease. No affected pigs were seen by us, but according to statements made by the local people only pregnant sows were affected, and they usually died soon after the birth of their young, unless these were removed at once.

A man named Chang Leh, with total incapacity for work because of joint changes, was persuaded to undertake the journey to Chengtu for laboratory and x-ray study. He had been born in the neighbourhood and had lived there continuously. He was then 37 years old, but for the past few years had looked to be over 50 owing to the very marked deformity, stoop and partial ankylosis of the large joints of his arms and legs. During the previous few months he had been very ill, probably due to some intercurrent infection. Three times during the previous 18 months he had walked, with the aid of a stick, the approximately two miles from his home to the Shih Men K'an dispensary. He had been regarded as probably syphilitic, but a Kahn test, twice repeated, was negative. The patient reported that his early health had been good, but that he had suffered from stiffness in the joints since the age of 13, and this had gradually become worse until he could no longer work. Relatives stated that both his parents had showed marked mottling of the teeth and had been crippled even more severely than their son. Both parents were said to have "died of the disease". The patient claimed to have fair general health but was obviously suffering from poverty and neglect. He had two children, aged 3 and 4 years, approximately.

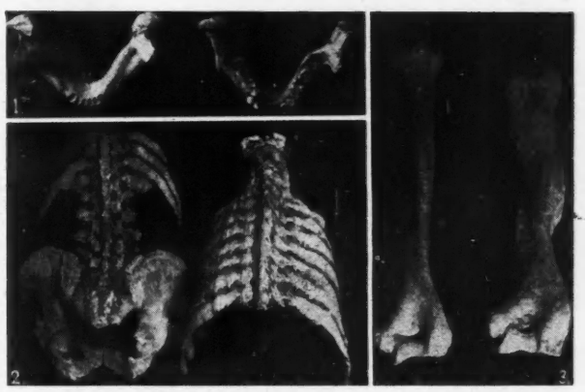


**Fig. 1.**—Left, mandible from case of fluorosis; right, normal mandible. **Fig. 2.**—Fluorine intoxication. Rear view of chest wall, lower spinal column and pelvis. **Fig. 3.**—Humerus from case of fluorosis, compared with normal bone.

After arrangements had been completed for Chang Leh to be transported to Chengtu he fell off a rock, about 4 feet high, and died almost immediately, apparently from a broken neck. Later, in 1944, Dr. Oliver Lyth admitted into hospital in Chaotung another case of advanced fluorosis, but he also fell and fractured his spine at about the seventh cervical vertebra and died about four days later of hypostatic pneumonia. Lyth[5] wrote: "It is evident that these folk are very liable to fracture the spine, because they are unable to save themselves when they have a slight fall".

Efforts to get other victims of the disease to undertake the long journey to Chengtu were fruitless, but the widow of Chang Leh agreed that if she were permitted to keep the travel money that had been paid to her late husband she would allow us to take possession of his skeleton, provided we left him buried for one year. This was agreed to, but further delay arose due to the departure of T.S.O. from Chaotung and the temporary absence of L.G.K. from China. Dr. O. Lyth was requested to arrange for the exhumation of the skeleton and its transfer to Chengtu as soon as the year was up. This he kindly did, but before sending the skeleton he photographed the vertebral column with the attached ribs and pelvis and, without seeking our permission, he published this photograph along with a description of the entire skeleton (Lyth[6]). It was not until 1947-48 that it became possible for us to take up the study of the skeleton of Chang Leh, which had reached Chengtu in 1945. Then one of us (H.P.L.) undertook the determination of the fluorine content of the various bones and their detailed description.

In experimental animals the changes in bone that result from an excessive intake of fluorine were described first in 1891 by Bandl and Tappeiner, buit it was not until 1932 that Moller and Gudjonsson[7] recorded the changes seen in radiograms of cryolite workers. Since then Roholm and many others have given detailed descriptions of cases of fluorine intoxication, but usually as seen in x-ray pictures of the living subjects or in animals.

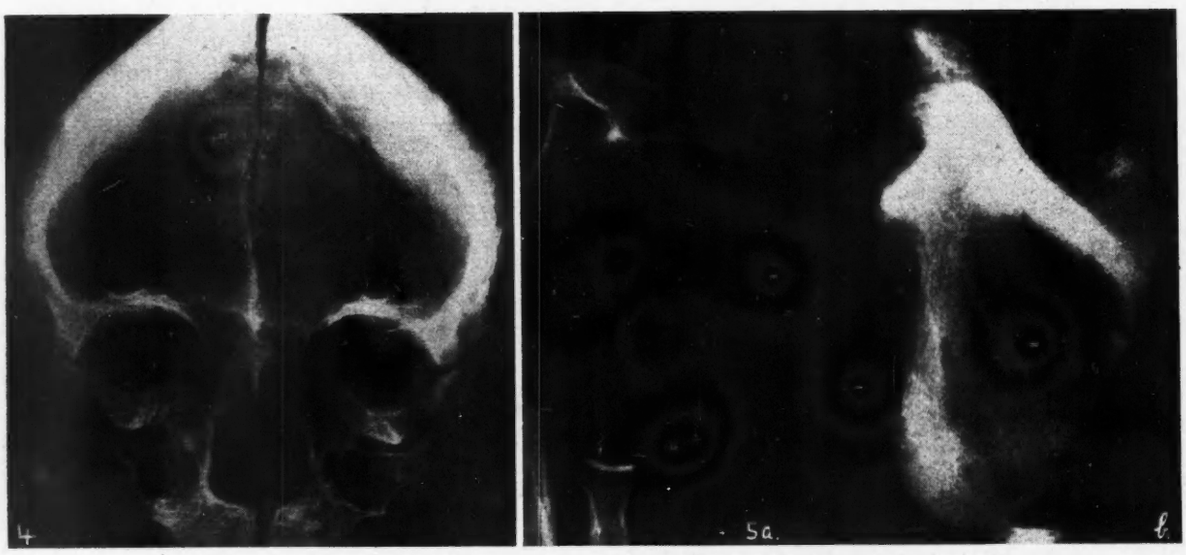



**Fig. 4.**—Radiogram of skull bones from case of advanced fluorosis. The bones were re-assembled for the picture. **Fig. 5.**—(a) X-ray of normal scapula. (b) Scapula from case of advanced fluorine intoxication. The exposure for the two bones is the same.

The bones of the entire skeleton of our case are markedly thickened and are very porous and brittle. The flat bones are about twice the normal thickness and the long bones are increased in diameter. The surfaces of all bones have lost their smooth appearance, but manifest different degrees of roughness, the larger bones being the most noticeably roughened. Anatomical prominences, ridges and places of muscle attachment are very much exaggerated. Those on the tibiæ and fibulæ are so pronounced as to resemble long spinous outgrowths. The most striking abnormalities are those of the vertebræ, which are fused to make of the spinal column one long, rigid bone. All the intervertebral discs are completely ossified. The sacrum is fixed to the fifth lumbar verte-

bræ, and the atlas is fused to the sphenoid and the base of the occipital bone. Since Lyth[6] published a description of individual bones, this will not be repeated here. The illustrations show most of the most obvious changes.

Table I shows the weights of most of the bones from our skeleton, compared with normal ones. To get fairly accurate normal weights for comparison we averaged those of ten normal bones of approximately the same size as our specimens. The table shows a striking increase in the weight of nearly every bone, even though it was difficult, and in some cases impossible, to find "normal" bones as small as those of the fluorosis skeleton. This was especially true of the long bones, for all adult bones in the Anatomy Museum were longer than those of the skeleton. It is also true that the normals were those of Chinese, whereas the skeleton was that of a Miao. It will be noticed that the greatest increases in weight are in the scapulæ and clavicles, which are from three and a half to almost four times the weights of the average normal bones. The bones of the cranium also show a very large increase. The mandible, on the other hand, is slightly lighter than the average normal.

TABLE I.
BONE WEIGHTS

| *Bone* | | *Fluorosis specimen* | *Average normal* | *Range of normals* | *Percentage increase* |
|---|---|---|---|---|---|
| | | gm. | gm. | gm. | % |
| Skull | | 1010 | 521 | 352–750 | 93.9 |
| Mandible | | 77 | 88 | | -12.5* |
| Clavicle, | rt. | 49 | 15 | 10– 20 | 224.5 |
| | lt. | 48 | 14 | | 242.8 |
| Scapula | rt. | 208 | 54 | 44– 65 | 285.2 |
| | lt. | 195 | 50 | | 290.0 |
| Humerus, | rt. | 190 | 123 | 93–144 | 54.5 |
| | lt. | 175 | 111 | | 57.7 |
| Radius, | rt. | 45 | 34 | 23– 41 | 32.4 |
| | lt. | 43 | 34 | | 26.5 |
| Ulna, | rt. | 68 | 49 | 37– 54 | 38.8 |
| | lt. | 65 | 45 | | 44.4 |
| Femur, | rt. | 490 | 307 | 232–385 | 59.6 |
| | lt. | 505 | 326 | 265–380 | 54.9 |
| Tibia, | rt. | 235 | 159 | 95–195 | 47.8 |
| | lt. | 240 | 161 | 70–245 | 49.1 |
| Fibula, | rt. | 70 | 49 | 47– 65 | 42.9 |
| | lt. | 68 | 41 | 39– 65 | 65.9 |

*Decrease.

Only seven teeth were received, and most of them were largely denuded of their enamel. When present it very thinly coats the dentine,

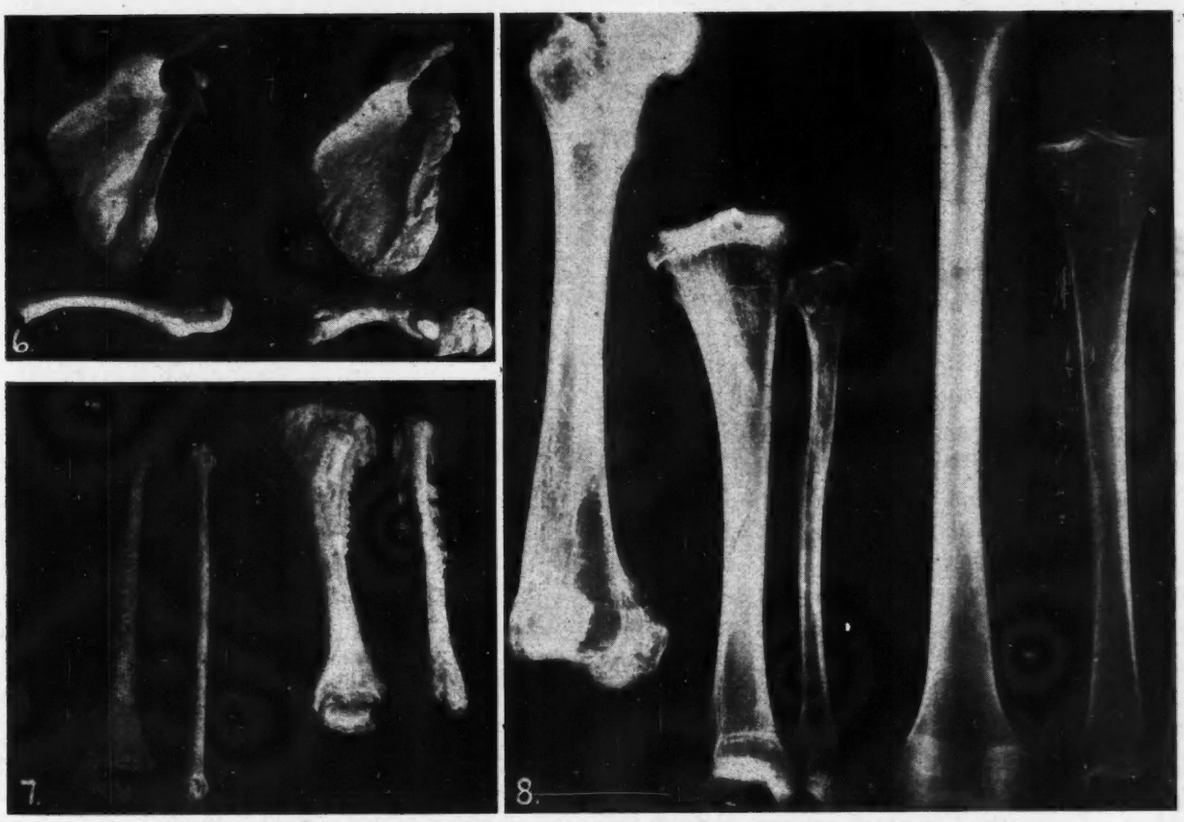



**Fig. 6.**—Scapula and clavicle from case of advanced fluorosis, compared with normal bones. **Fig. 7.**—Left tibia and fibula from case of advanced fluorosis, compared with normal bones. **Fig. 8.**—Radiograms of femur, tibia and fibula from case of fluorosis, compared with normal bones. All recorded with same exposure.

and presents a rough and pitted surface, resembling calculus. It does not show the mottling seen in life. All roots are short and excementosed. Apparently the enamel had been lost through masticatory wear.

Radiographic studies have been made by various radiologists on cases of fluorosis. The earliest description of the changes in bones and ligaments due to chronic fluorine poisoning was that of Moller and Gudjonsson[7] who described a curious sclerotic affection of the bones, ligaments and muscular attachments found in 30 of the 78 workers engaged in the crushing and refining of cryolite whom they examined radiologically. This was attributed to the deposition of calcium fluoride in the bones. They describe "the almost complete effacement of the osseous structure (in the pelvis), which has been replaced by an almost absolute milky white opacity . . . (speaking of the spinal column) in severe cases also the ligaments and fibrocartilaginous attachments are the seat of extensive calcification. . . . In the extremities the compact layers of bone are much thickened, and the marrow cavities narrowed." More recently others have described similar changes in the bones of those exposed to fluorine. Among these are Bishop,[8] Moller[9] and McGarvey and Ernstene.[10]

X-ray pictures of a number of the bones of our case were made for us by Dr. Margaret Tucker. As shown in those reproduced here there is a very great increase in bone density, a thickening of trabeculæ where these are still visible and a narrowing of the marrow cavities in the long bones to the point of apparent complete obliteration in the middle of the shaft. It is possible also that there is some rarefaction near the ends of some of the long bones. Weinmann and Sicher[11] point out that the findings in spontaneous and experimental fluorosis are, in part, contradictory. Human patients are usually diagnosed as having osteosclerosis whereas animals are described as having osteoporosis or "osteomalacia". Our radiograms might indicate that both processes are taking place, the sclerosis predominating over the greater part of most of the bones but osteoporosis being evident near the ends of some of the long bones. It is planned to make histological examinations of some of our bones at a later date, but animal experiments indicate that in fluorine intoxication there is an increased destruction and absorption of bone accompanied by a compensatory formation of new bone. The predominating picture seems to depend upon the age of the animal and the dose of fluorine. In general young animals or those receiving large doses show osteoporosis, whereas in older individuals or after low dosage sclerosis of the bones is the predominating result. It seems not unlikely that both processes might be at work in the human also.

*Fluorine content of bones.*—Small portions of a number of the bones were removed and the fluorine content determined, using the distillation method of the Association of Official Agricultural Chemists.[12] The portion of bone was ashed in a muffle furnace and the fluorine content of the ash determined. The results are shown in Table II.

TABLE II.

FLUORINE CONTENT OF BONES IN CASE OF FLUOROSIS

| *Region* | *Bone* | *—Fluorine content—* *Ash* | *Bone* |
|---|---|---|---|
| | | *mgm. per gm.* | *mgm. per gm.* |
| Head | Skull | 22.09 | 15.02 |
| | Temporal | 20.58 | 14.61 |
| | Mandible | 20.66 | 14.26 |
| | Tooth, canine | 39.65 | 26.57 |
| | Tooth, incisor | 25.83 | 17.56 |
| Upper extremity | Clavicle | 14.70 | 9.70 |
| | Scapula | 18.73 | 12.55 |
| | Radius | 18.82 | 12.42 |
| | Capitatus | 18.31 | 12.06 |
| | Metacarpal | 21.25 | 14.03 |
| | Finger | 18.90 | 11.91 |
| Trunk | Rib | 20.83 | 13.55 |
| | Vertebra, lumbar | 18.65 | 11.75 |
| | Ilium | 17.56 | 11.24 |
| Lower extremity | Patella | 21.08 | 12.44 |
| | Calcaneum | 20.66 | 13.22 |
| | Metatarsus, 2nd | 18.65 | 12.68 |
| | Toe | 19.15 | 12.45 |

For comparison preliminary determinations were made on portions of two apparently normal bones taken at random from the Museum of the Anatomy Department. These showed fluorine contents of 1.18 mgm. per gm. for a vertebra (dry ash) and 1.09 mgm. per gm. of tibia (dry ash). Hence, the results of our analysis show fluorine contents of nearly twenty times the normal in many of the bones examined, with even higher fluorine content in the teeth. It is interesting that the bones which had increased most in weight, the scapulæ and clavicles, contained relatively small percentages of fluorine. These

results are higher than those reported by many other investigators, such as Wolf and Kerr.[13]

### DISCUSSION

Several good reviews on the toxicity of fluorine in both animals and man have been published. Roholm's monograph has already been referred to. The most recent review of the literature is that of K. J. Sinclair,[14] and this should be consulted for a general discussion of the toxicity of fluorine compounds, and for reference to earlier works. Fluorosis in factory workers has been reported from various countries, but its spontaneous appearance from the ingestion of an excess of fluorine in the drinking water has not yet been recorded from many localities. Apparently it is rare on the North American continent, but a few cases have been reported, the first by Linsman and McMurray.[15] It is quite possible that endemic centres exist but that the cause of the disabling spondylitis or other joint affections has not been determined, and a diagnosis of chronic arthritis has resulted. Few cases in Canada or the United States will be found to be as dramatic as that recorded here from Southwest China, but by calling attention to the advanced stage of this condition help may be afforded to the diagnosis of early cases.

### REFERENCES


1. VOLKER, J. F. AND BIBBY, B. G.: *Medicine*, **20**: 211, 1941.
2. ROHOLM, K.: Fluorine Intoxication, H. K. Lewis, London, 1937.
3. SHORTT, H. E., MCROBERT, G. R., BARNARD, T. W. AND NAYER, A. S. M.: *Indian J. M. Research*, **25**: 553, 1937.
4. PUNDIT, C. G., RAGHARVACHARI, T. N. S., SUBBA RAO, D. AND KRISHNAMURTI, V.: *Indian J. M. Research*, **28**: 533, 1940.
5. LYTH, O.: Personal communication to T. S. Outerbridge, January 1, 1945.
6. *Idem*: *Lancet*, **1**: 233, 1946.
7. MOLLER, P. F. AND GUDJONSSON, S. V.: *Acta radiol.*, **12**: 269, 1932.
8. BISHOP, P. A.: *Am. J. Roentgenol.*, **35**: 577, 1936.
9. MOLLER, P. F.: *Brit. J. Radiol.*, **12**: 13, 1939.
10. MCGARVEY, C. J. AND ERNSTENE, A. C.: *Cleveland Clin. Quart.*, **14**: 108, 1947.
11. WEINMANN, J. P. AND SICHER, H.: Bone and Bones: Fundamentals of Bone Biology, C. V. Mosby Co., St. Louis, 277-284, 1947.
12. Association of Official Agricultural Chemists: Methods of Analysis, 5th ed., Washington, 1940.
13. WOLF, W. A. AND KERR, E. G.: *Am. J. M. Sc.*, **195**: 493, 1938.
14. SINCLAIR, K. J.: The Toxicity of Fluorine Compounds. A Review of the Literature. Medical Research Council Memorandum No. 22, Industrial Fluorosis, His Majesty's Stationery Office, London, 97-119, 1949.
15. LINSMAN, J. F. AND MCMURRAY, C. A.: *Radiology*, **40**: 474, 1943.
16. KEMP, F. H., MURRAY, M. M. AND WILSON, D. C.: *Lancet*, **2**: 93, 1942.


## PSYCHOSOMATIC DISTURBANCES AND THEIR BEARING ON THE WORKER'S EFFICIENCY*

**H. Graham Ross, M.D.**

*Montreal, Que.*

THE function of the doctor in industry is to maintain those under his supervision in the highest possible state of health and physical efficiency. To do this successfully demands acceptance of the broad modern concept which defines health as not merely the absence of organic disease, but a satisfactory physical, mental and emotional adjustment of the individual to his environment. Unless such an adjustment is achieved, a state of "good health" does not exist.

With each advancing year, it is realized that more and more symptom complexes formerly considered to be organic in nature are explainable on the basis of reaction to emotional tension, fears, frustrations and disappointments. These fears or frustrations may in certain few instances lead to actual breakdown or, and much more commonly, result in translation to physical symptoms which may be referable to almost any of the body systems and give rise to headaches, dizziness and stomach trouble, to rapid heart action and increased blood pressure, to extreme fatigue or even paralysis.

It is, I believe, safe to state that the physician in industry sees in his practice more cases of emotional disturbances with their attendant somatic symptoms, than does any other branch of the medical profession, even including the psychiatrist. The volume of patients seen in the average psychiatric practice is, I think, smaller and is composed for the most part of the more advanced cases of mental and emotional disturbances. Where employees have free access to the medical department, as they should, and the doctor assumes his proper responsibility as counsellor and friend, the high incidence of psychosomatic disturbances is apparent. Most doctors in industry will, if questioned, estimate that fewer than 50% of their cases suffer from organic disease.

The importance of psychosomatic disturbances in their bearing on the worker's

* Read at the Eightieth Annual Meeting of the Canadian Medical Association, Section on Industrial Medicine, Saskatoon, June 15, 1949.

efficiency may be realized when one considers their relation to absenteeism. According to the most reliable figures available, 30% of sickness absence in industrial groups is due to emotional disturbances. Emotional ill-health ranks second only to the common cold as a cause of lost time. In addition to this is an incalculable degree of lowered production efficiency in workers who may be on the job but suffering from emotional disturbances. Their cost to industry, not only in lowered production but in time consumed by supervision in dealing with these problems, nobody knows. Consider also the fact that the emotionally disturbed are the accident prone and some rather startling figures may be developed.

These emotional disturbances present a challenge to the doctor in industry. At the same time, the proper diagnosis and treatment of these conditions offers him a unique opportunity to make a material contribution to the efficient operation of his industry and to the health standard of his community.

The patient suffering from a gross mental disturbance presents no serious problem to the industrial medical department. The care of such cases is beyond the scope of the physician in industry and they are immediately referred for institutional or other curative treatment. The emotionally disturbed employee, on the other hand, is definitely the responsibility of the industrial physician. Although these may be classed as "psychiatric cases", it is no more practical nor necessary to send them all to a psychiatrist than it is to refer every case of common cold to a specialist.

In approaching this problem, it is of primary importance that the nature of these conditions be perceived, an accurate diagnosis made and proper treatment instituted. Although such a statement may be applicable to any health problem, it is particularly true of psychogenic illness. We have all seen too many tragic examples of individuals who have become chronic invalids, suffering from "fallen stomachs", "liver trouble", "floating kidney" or "heart trouble", because some physician, believing that his inability to demonstrate the presence of organic disease was an admission of professional defeat, has pinned some such vague diagnostic label on them. The list of those who have undergone operations for various conditions, without visible improvement, is equally striking.

People seldom consult a doctor, at least in industry, complaining of being emotionally disturbed. Rather, their complaints present themselves in some somatic form, most commonly referable to the digestive, cardiovascular or locomotor systems, and the primary problem here is one of diagnosis. Some years ago, I presented a paper which stressed the importance of eliminating, by appropriate diagnostic methods, all possibility of organic disease before falling back on a "psychosomatic" diagnosis. It cannot be argued that this is not a sound, conservative approach to the problem. In the light of subsequent experience, however, and at the risk of being accused of heresy, it is suggested that no extensive or expensive laboratory tests and other procedures should be undertaken until the emotional background of the case is studied and a complete appraisal of these factors is made. The patient should be spared the cost and inconvenience of x-rays and laboratory examinations until a clear indication for these diagnostic methods is apparent.

Psychosomatic symptoms are usually typical and fairly obvious, although the causative factors may be complicated and obscure. They do not develop over-night and frequently are the result of an emotional pattern which can be traced back to the childhood and even infancy of the patient. Symptomatic treatment in these cases is of little value in effecting a cure. The cause must be identified and dealt with in order to achieve a satisfactory result.

Although difficult to classify, it would appear that they fall roughly into two groups:

1. The "chronic" case, where the emotional maladjustment is deep-seated and of long duration and the original cause may lie in some remote incident or situation dating back to the childhood of the patient. These cases pose a very difficult problem in industry. They are the ones which are diagnosed as suffering from "general debility", or some equally vague condition, and do not respond to any type of medication. Possibly an extended course of psychotherapy may produce some results, but this is beyond the sphere of the doctor in industry, not only because of his limited training in psychiatric techniques but because of the time element involved. To determine the cause of

the trouble and to carry out effective treatment demands more time than the industrial medical department can reasonably devote to each individual case. Indeed, such "systematic" treatment is the responsibility of the outside practitioner and these cases are better referred to a psychiatrist. Even then, I may add, the prognosis is not too promising.

2. The "acute" case, where the cause of the disturbance is of fairly recent origin and may be found in the work, social or domestic situation. The term "acute" is actually a misnomer and is used merely in the relative sense, as these cases take some time to develop, and can seldom be ascribed to any single cause. They are, however, not too difficult to diagnose and yield more readily to treatment than those in the first category. The most important phase of the treatment is, of course, correction of the cause of trouble.

When the cause of the emotional disturbance lies outside of the work environment, the responsibility of the doctor in industry is limited. In fact, it would appear logical to follow, in the case of functional ailments, the same principle which we apply to organic disease. Where the illness is non-occupational in origin, the efforts of the physician in industry may reasonably be restricted to diagnosis and emergency care, leaving the curative treatment to the outside practitioner. In practice, however, it seems reasonable for the industrial physician to supervise these patients until such time as the family doctor or specialist assumes the responsibility of their care. If, on the other hand, the source of trouble lies in the work situation, the individual physician must assume a greater share of responsibility for the care and treatment of the patient as well as for the correction of the cause.

In considering the cause of psychosomatic disturbances, it is found that these conditions almost always are accompanied by a state of excessive nervous tension, at least, this is true when the disturbance is of occupational origin. It therefore follows that any study of psychosomatic disturbances involves a consideration of tensional states.

Tension has been defined as "degree of preparedness for action". In order to accomplish anything, one must be under a certain degree of nervous tension. The only time that we are completely free from tension is when we are asleep. The normally adjusted individual, when the need for "preparedness for action" has passed, can relax. There is what we may term an "optimum degree" of tension for producing a desired result. If, however, the state of tension is carried over beyond the optimum point, it becomes pathological, resulting in lowered mental and physical efficiency and may finally lead to a complete breakdown. Psychosomatic complaints are among the early symptoms of excessive nervous tension.

Nervous tension was originally a protective mechanism which served our primitive ancestors well when confronted by physical danger. Their survival depended upon their "preparedness for action", when their security was threatened. This reflex automatic mechanism still functions in the same way and responds to the same stimuli, even though our way of life has changed considerably during the past few thousand years. Primitive man became tense when his security was threatened by some physical force, that is, when he felt insecure. In our modern civilization, the people who suffer from excessive tension are those who are faced with a situation which, consciously or subconsciously, they fear is beyond their capacity to handle. In other words, they feel insecure.

Situations producing a sense of insecurity with resulting excessive nervous tension and psychosomatic disturbances may develop either within or without the work situation. Sometimes both contribute to the total picture. In my own experience, I think the cause is more frequently found in some situation, financial, social or domestic, which is completely unrelated to the job. There are, however, many cases where the trouble can be traced directly to the type of work or to inter-personal relations on the job. It is actually impossible to separate these two situations into air-tight compartments. The worker is the same individual whether he be at home or on the job, and tensions which are developed at home or elsewhere are carried over into the work environment and become important factors, affecting his adjustment to the job, his supervisor and his fellow workers. The reverse, of course, is equally true, and emotional disturbances developing at work may be carried into the outside relations of the patient.

It is, however, with the work environment that the doctor in industry is chiefly concerned and it is here that he finds his greatest opportunity for control and corrective measures. During February and March, 1949, an interesting series of seminars was held at the Allan Memorial Institute, Montreal, under the leadership of Dr. D. Ewen Cameron. This series was part of a larger program, organized by the Industrial Relations Centre of McGill University, and was devoted to a study of "Tensional States in Industry". As a result of these studies, certain ideas were developed and certain conclusions reached regarding the characteristics of jobs likely to lead to excessive tensional rise. These characteristics were classified as follows:

### CHARACTERISTICS OF JOBS LIKELY TO LEAD TO EXCESSIVE TENSIONAL RISE

1. *The job itself*:

(*a*) *Fragmentation.*—The modern tendency to assembly line production has so broken down jobs that the worker is frequently performing motions which have no meaning for him in relation to the finished product, and are repetitious and monotonous. Some workers can overcome this monotony and give meaning to these jobs by imposing a pattern on what is always repetitious and relatively meaningless. They do this by such devices as reckoning the units which they produce in groups of ten or by setting up a timing schedule by themselves or by entering into some type of competition. More imaginative and highly intelligent people are particularly apt to develop tensional states on these fragmented jobs. Some industries have found it useful to demonstrate to the worker, by plant tours and other means, how the fragmented job fits into a meaningful whole.

(*b*) *Degree of responsibility.*—There is a definite relationship between the degree of responsibility involved in a job and the development of tensional states. The tendency to excessive tension is increased by such factors as undefined responsibility, divided responsibility, excessive responsibility and responsibility without authority.

(*c*) *Physical factors.* — Excessive motor demands. These are found in machine-paced jobs, particularly where the industrial process has resulted in taking the control of speed of the operation entirely out of the hands of the workers. In such jobs, the tendency to the development of excessive tension is diminished if the worker is in a position to control the speed of the process with which he is working.

Excessive sensory demands, *e.g.*, noise, vibration, humidity, temperature, space, fumes, odours, lack of outside view, untidiness, a special category of the "straitjacket" type of situation, that is, a situation in which demands were made on the worker to perform in such-and-such a way at such-and-such a time, regardless of his own momentary inclinations.

(*d*) *Unpredictable flow of work.*—This is the type of situation in which excessive demands are made on the individual to shift from one kind of activity to another with frequency. This type of job is found at all levels through the industrial organization from the Executive to the unskilled worker.

(*e*) *Job requirements above and below the individual's capacity.*—Under this heading are classified jobs too rapid or too slow a tempo and jobs requiring more or less intellectual capacity than the individual possesses.

(*f*) *Deadline jobs.*—Excessive tension may develop in the worker who is repeatedly faced with the problem of meeting deadlines in his work. Such a situation may affect not only the individual concerned but also those dependent upon him in the same department.

(*g*) *Repetitive jobs.*—The tendency of repetitive jobs to produce tensional states would appear to have been over-rated. There are many ways to make repetitive jobs interesting and provide the worker with a sense of accomplishment.

2. *The job setting*:

Under this heading are classified what may be termed interpersonal relations on the job.

1. *Non-acceptance.*—Tensional states are prone to develop in individuals who are not accepted by (*a*) the group; (*b*) the boss; (*c*) the public; (*d*) subordinates.

2. *Rigid job standards.*—Tension may develop as the result of a clash between the boss' standards and the group standards. This is a problem of supervision.

3. *Subordinating individual interests to group requirements.*—This involves co-operation in general and is closely tied up with (1).

4. *Inadequate qualifications.*—The worker with inadequate qualifications to perform the job is

suffering under a handicap which will usually result in the development of excessive tension. The answer to this is the provision of adequate training and preparation before the worker is assigned to such a job.

5. *Inadequate supervision.*—(*a*) Lack of efficient direction; (*b*) lack of impartiality; (*c*) lack of active recognition; (*d*) lack of leadership; this may result in over-direction or under-direction by the supervisor and, in either case, will produce a sense of frustration or insecurity, leading to excessive tension.

From here, the seminars went on to a consideration of the characteristics of individuals particularly likely to develop tension. Although time does not permit a complete study of these characteristics, the following classification of tension prone individuals may be of interest.

### CHARACTERISTICS OF INDIVIDUALS PARTICULARLY LIKELY TO DEVELOP TENSION

1. *Deviations in motivations.*—(*a*) Overmotivation, or stimulation, where effort is not sufficiently rewarded by achievement. (*b*) Overmotivation, without capacity. (*c*) Undermotivation or, more properly, where the personal motivation is not identified with the job which has to be done, so that in doing the job, there is no sense of reward of accomplishment. (*d*) Conflict of motives, where there is not sufficient skill, training or confidence that the decision made will be rewarded in the sense of meeting the personal goal. Under personal goals, there might be such factors as: pride, self-respect, recognition, appreciation, control over what the person does, freedom from excessive worry, self-expression, self-development, personal security and safety, a sense of belonging, of being accepted, etc.

2. *Individuals in the pre-retirement group.*—The ageing worker, faced with a failing physical capacity and possibly an uncertain future, is prone to develop a sense of insecurity with resulting tension.

3. *Special personality characteristics.* — (*a*) Low frustration tolerance; (*b*) insecurity; (*c*) inability to co-operate; (*d*) feelings of inadequacy; (*e*) hostile personalities.

4. *Physically handicapped people.*—(*a*) Physical defects, such as amputations, defective vision, etc.; (*b*) general debilitating conditions, such as anæmia; (*c*) degenerative conditions—hypertension, cardiac insufficiency—the ageing worker; (*d*) individuals who have previously suffered injuries at work and are in the process of being rehabilitated.

At first glance, these problems may appear to be chiefly supervisory in character. This is true to a certain point only. If we accept the concept of total health, which includes mental and emotional health as well as physical—if these emotional (psychosomatic) conditions are taking a toll of the health and productive capacity of the worker—then their detection, correction and prevention is the responsibility of the industrial physician, as much as any other health condition.

If the worker's emotional health is being affected by poor job assignment, insufficient training, poorly organized work schedules, bad supervision by ill-trained supervisors, then improvements in job assignments, employee training, work schedules, supervisory training programs and any other factors listed above become of interest to the doctor in industry. It is not proposed that the medical department assume full responsibility for any of these functions which commonly come under the heading of "Industrial Relations", nor that the physician step outside of his staff rôle to assume line authority in management. Without exceeding his normal advisory function, the industrial physician is, however, by the nature of his training and professional status, in a position to provide valuable guidance and direction to management in the development of personnel policies directed toward the establishment of better human relations in industry which, in turn, lead to better health.

It is encouraging to note that this concept of the responsibilities of the industrial medical department appears to be gaining acceptance. Research is at present being conducted and some interesting results have been obtained. In one large company, the medical department is co-operating with the personnel department in the development of a "management training program", directed toward the establishment of better mental and emotional health within the organization.

When one views these broadening horizons, it would seem a far cry from the day when "Industrial Medicine" and "Traumatic Surgery" were synonymous.

RÉSUMÉ

Le médecin dont le champ d'action est l'industrie doit maintenir chez les ouvriers une santé excellente et le rendement physique le plus élevé possible, la santé n'étant pas seulement l'absence de maladie organique mais un état de bien-être physique, mental et émotif. L'auteur émet l'opinion que c'est dans l'industrie que l'on rencontre le plus de troubles émotifs. La plupart des médecins employés dans l'industrie estiment que dans leur pratique ils ne trouvent qu'environ 50% de troubles organiques. 30% des absences pour maladie sont causées par des troubles émotifs. Il y a seulement le rhume qui ait un pourcentage plus élevé. En général ces états psychiques peuvent se diviser ainsi; (1) les cas chroniques, où la cause remonte à très longtemps. En général ce sont des cas pour le psychiâtre; (2) les cas aigus où l'origine des troubles émotifs est récente et peut être localisée à une situation domestique, sociale ou au travail.

Surtout lorsque l'on peut retracer le début des troubles au travail le médecin de l'industrie peut être d'une grande utilité. Il existe à la base de tous ces troubles un état de tension nerveuse qui peut être défini comme une "préparation à l'action". Il s'agit d'un réflexe tout à fait normal qui devient pathologique lorsqu'il est prolongé. L'auteur élimine ensuite les principales causes dans l'industrie qui peuvent conduire à un état exagéré de tension nerveuse comme un fractionnement trop marqué du travail, une responsabilité mal placée, une répétition constante, les relations des ouvriers avec les patrons et les autres ouvriers, des qualifications insuffisantes etc. Mais il est certain que ces facteurs doivent renconter un terrain propice pour se développer. Ce terrain sera trouvé, *e.g.* chez des ouvriers à la veille d'être mis à leur retraite.

YVES PRÉVOST

## THE USE OF COMBINED ANTIGENS IN THE IMMUNIZATION OF INFANTS*

**Donald S. Fleming, M.D., D.P.H.† and Louis Greenberg, M.Sc., Ph.D.‡**

*Ottawa, Ont.*

### PART II. DURATION OF IMMUNITY

AN earlier investigation as to the effectiveness of combined antigens in the immunization of infants has been reported in this Journal.[1] This study demonstrated that in a group of children, whose average age was four months, the response to diphtheria toxoid was substantially enhanced when it was given in combination with pertussis vaccine or with pertussis vaccine and tetanus toxoid. The immunizing efficiency of pertussis vaccine was not appreciably affected by combination with diphtheria and tetanus toxoids. Evidence was produced of satisfactory response to tetanus toxoid when it was combined with diphtheria toxoid and pertussis vaccine.

This particular work was designed to evaluate immunizing efficiencies of various antigens given singly and in combination and no attempt was made to investigate optimal size or spacing of dosage. The present report is a follow-up on this earlier study and is concerned with the level of the immunity present one year after the original course of immunization.

In the original investigation 111 infants received either combined diphtheria toxoid and pertussis vaccine or combined diphtheria and tetanus toxoids and pertussis vaccine. One year later it was possible to obtain blood samples from 29 of these children and determine the blood serum levels of diphtheria antitoxin, pertussis agglutinins and, where the child had previously received tetanus toxoid, tetanus antitoxin. This sample is 26% of the original group, but to the best of our knowledge it is a purely random selection, and the results obtained should be representative of the whole group.

### EXPERIMENTAL RESULTS

A. *Diphtheria antitoxin levels.*—One month after the original course of immunization, the 29 children showed an average level of 0.12 units of diphtheria antitoxin per c.c. of blood serum. This antitoxin level was determined by the rabbit skin test method.[2] Repetition of these titrations one year later showed that the average level was now 0.09 units per c.c.

These results are shown in greater detail in Table I and it will be seen that 27 of the 29 children (93%) one year after immunization had more than 0.008 units of diphtheria antitoxin per c.c. of blood serum. It is generally accepted that 0.004 or 1/250 unit is sufficient for immunity to diphtheria. The remaining two children were found to have no measurable diphtheria antitoxin.

B. *Pertussis agglutinin levels.*—The determination of immunity to pertussis is a matter on which authorities disagree, because the portion or fraction of *H. pertussis* responsible for protective immunization has yet to be isolated. The agglutinin titre has been most frequently used for this purpose and it does seem reasonable to employ it as an indication that an immune response has occurred.

* From the Department of Bacteriology and Immunology, McGill University, Montreal, Que., and the Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, Ont.

† Associate Professor of Bacteriology, McGill University and Medical Director of the Child Health Association of Montreal.

‡ Bacteriologist, Laboratory of Hygiene.

Twenty-one of the children had their blood sera titrated for agglutinins to *H. pertussis* one month and one year after immunization. The results are set forth in Table II where it will be noted that the titres, although low, tend to be higher one year after immunization.

TABLE I.

DIPHTHERIA ANTITOXIN LEVELS ONE MONTH AND ONE YEAR AFTER IMMUNIZATION

| | Time | |
|---|---|---|
| | *One month* | *One year* |
| Diphtheria Antitoxin Units: | | |
| >0.512 <1.024 | - | 1 |
| >0.256 <0.512 | 6 | - |
| >0.128 <0.256 | 3 | 2 |
| >0.064 <0.128 | 3 | 9 |
| >0.032 <0.064 | 2 | 13 |
| >0.016 <0.032 | 3 | 1 |
| >0.008 <0.016 | 2 | 1 |
| >0.004 <0.008 | 9 | - |
| >0.002 <0.004 | 1 | - |
| <0.002 | - | 2 |
| Total subjects | 29 | 29 |
| Average level | 0.12 | 0.09 |

The pertussis agglutinin levels reported by various authors have differed widely, likely because of differences in technique, and it is therefore difficult to compare results from different sources. Some authorities hold that a level of 1:320 is necessary for protection,[3, 4] but others[5] feel that a rapid slide test may be used to demonstrate immunity and in our experience a titre of 1:8 gives a positive rapid slide test. If a titre of 1:8 be accepted as indicating immunity, then the percentage protected in this group has increased from 29 to 81% in one year.

TABLE II.

PERTUSSIS AGGLUTININ LEVELS ONE MONTH AND ONE YEAR AFTER IMMUNIZATION

| | Time | |
|---|---|---|
| | *One month* | *One year* |
| Pertussis agglutinin titre: | | |
| 1:128 | - | 1 |
| 1:64 | - | 4 |
| 1:32 | 2 | 4 |
| 1:16 | 2 | 2 |
| 1:8 | 2 | 6 |
| 1:4 | 3 | 1 |
| 1:2 | 9 | 1 |
| Nil | 3 | 2 |
| Total subjects | 21 | 21 |

C. *Tetanus antitoxin levels.*—Seventeen of the original group which received toxoid combined with diphtheria antitoxin and pertussis vaccine were retested for tetanus antitoxin titres in their blood sera one year later. The results obtained are shown in Table III and it will be seen that although all subjects demonstrated protection against tetanus one month after the original course of immunization (*i.e.*, possessed more than 0.1 unit — American — per c.c. of blood serum) the levels now present are considerably higher. In fact, the average level having increased from 0.03 unit to 0.55 unit per c.c. of blood serum.

## DISCUSSION OF RESULTS

Evidence has become increasingly abundant as to the effectiveness of immunization with combined antigens[6] and at the same time it has been established that such immunization can be carried out in young infants. Some workers have questioned whether the immunity so established in these young infants would be as durable as that shown to be the case when immunization is delayed until the child has attained an age of nine months or greater.

TABLE III.

TETANUS ANTITOXIN LEVELS ONE MONTH AND ONE YEAR AFTER IMMUNIZATION

| | Time | |
|---|---|---|
| | *One month* | *One year* |
| Tetanus antitoxin units (American) | | |
| >1.024 <2.048 | - | 2 |
| >0.512 <1.024 | - | 5 |
| >0.256 <0.512 | - | 3 |
| >0.128 <0.256 | - | 6 |
| >0.064 <0.128 | 2 | 1 |
| >0.032 <0.064 | 6 | - |
| >0.016 <0.032 | 1 | - |
| >0.008 <0.016 | 1 | - |
| >0.004 <0.008 | 7 | - |
| Total subjects | 17 | 17 |
| Average level | 0.03 | 0.55 |

This study, reporting immunity levels determined one year after immunizing infants of an average age of four months with combined antigens, demonstrates that in this time the levels for diphtheria and tetanus antitoxins are very satisfactory and that the pertussis agglutinin titres, although not high, are still greater than those obtained one month after the original immunization.

## SUMMARY AND CONCLUSIONS

1. A random sample of 26% of a group of infants immunized at an average age of four months with combined antigens, was recalled for determination of the titres of diphtheria and

tetanus antitoxins and pertussis agglutinins in their blood sera one year after the original course of immunization.

2. After one year, 93% had a level of diphtheria antitoxin considered adequate for protection against diphtheria. This is as satisfactory a result as one would normally hope to achieve on original immunization of any age group in the population.

3. All tested after one year for tetanus antitoxin titre had a level well above that generally accepted as sufficient for protection against tetanus. There was a striking increase in the levels of tetanus antitoxin present in the period between tests.

4. Lack of agreement as to the criteria for immunity to whooping cough makes evaluation of this aspect of the study difficult. However, in this group the level of pertussis agglutinins has risen during the year following immunization and this indicates no decrease in immunity during this period.

5. The results recorded would support the feasibility and desirability of combining immunization against diphtheria, tetanus and whooping cough in infants of three to four months of age.

The authors wish to express their great appreciation to Miss E. M. Beith, Executive Director, and to the staff of the Child Health Association of Montreal for making this study possible. They are grateful to Mrs. M. Roblin-Detlor of the Laboratory of Hygiene for aid in the serum titrations.

REFERENCES

1. FLEMING, D. S., GREENBERG, L. AND BEITH, E. M.: *Canad. M. A. J.*, **59**: 101, 1948.
2. GREENBERG, L. AND GIBBARD, J.: *Canad. J. Research*, **27**: 1, 1949.
3. MILLER, J. S. *et al.*: *J. Pediat.*, **22**: 644, 1943.
4. SAKO, W.: *J. Pediat.*, **30**: 29, 1947.
5. POWELL, H. M. AND JAMIESON, W. A.: *J. Immunol.*, **43**: 13, 1942.
6. FLEMING, D. S.: *Am. J. M. Sc.*, **217**: 345, 1949.

PANCREATITIS IN INFECTIOUS MONONUCLEOSIS.—Twenty consecutive cases of infectious mononucleosis were studied at weekly intervals and in two instances a definite elevation of the values of serum amylase and lipase was demonstrated. This finding is suggestive of an associated pancreatic disturbance in patients with infectious mononucleosis. This was possibly a pancreatitis, but lymph node obstruction of the pancreatic ducts must be considered. It is quite possible that many asymptomatic, acute, subacute, and chronic inflammatory changes of the pancreas exist in association with viral diseases which at the present time are not appreciated. It is conceivable that such infection may play a rôle in the etiology of chronic relapsing pancreatitis, the pathogenesis of which remains obscure. — Myhre, J. and Nesbitt, S.: *J. Lab. & Clin. Med.*, **34**: 1671, 1949.

# ORAL CANCER IN THE FEMALE*

**Germain Pinsonneault, M.D.**

*Assistant-Director, Roentgentherapist in Chief,*

**and**

**Guillaume Gill, M.D.**

*Radiologist, Assistant of Service,*
*Institut du Radium,† Montreal, Que.*

A TENTATIVE study of the special characteristics of the oral cancer in the female has been made by the authors. During a period of seven years 723 cancers of the oral cavity were treated at L'Institut du Radium, Montreal. The present paper covers 28 cases encountered in the female. The conclusion from a study of these is that, in the female, for a similar histopathological appearance, the oral cancer is less infiltrative, less metastasizing and more radioresistant than in the male.

While analyzing the following five case histories, it occurred to us to determine the peculiar aspects of the oral cancer in the female.

CASE 1

On July 24, 1945, a 64 year old woman came for consultation because of a painful ulcerovegetative lesion of the right margin of the tongue which had begun 9 years previously, in 1936. Biopsies and treatments were carried out in another hospital in 1937, 1943 and 1945. In reviewing the records, we learned that the lesion was a squamous cell carcinoma of the tongue with local regrowth, and was treated each time with radiumpuncture.

The first dose, in 1937, was 1,152 milligram hours. A second dose of 576 mgh. was administered in 1943 and a third one of 1,152 in 1945. Following the last radiumpuncture, this woman received deep x-ray therapy and a total dose of 3,700 r. was delivered through the right cheek.

This woman was seen for the first time, on July 24, 1945. We observed an insidious ulceration which appeared simultaneously cancerous and radionecrotic. She was advised to apply methylene blue and halibut oil only and to come back in a month. We saw this woman three years later, on August 10, 1948. During this period, the lesion slightly extended towards the floor of the mouth, causing some induration.

It became evident, as demonstrated by the biopsy, that it was the same carcinoma which had been in evolution for the last 12 years. In view of the extension of the lesion and of the existing radionecrosis, we could not see the value of any possible treatment. Moreover we did not want to repeat any radiumpuncture. We only applied a palliative dose of deep x-ray without any change.

This patient is now in a cachectic state due to the mouth infection and feeding difficulties.

This observation showed: (1) The extraordinarily prolonged evolution of a carcinoma of the tongue. (2) The paradoxical and absolutely

* Read at the Eightieth Annual Meeting of the Canadian Medical Association, Section on Radiology, Saskatoon, June 15, 1949.

† Dr. Origène Dufresne, Director.

unusual absence of metastatic glands after 13 years. (3) The radioresistance to repeated radiumpunctures, while, in general, the primary lesions of a cancer of the tongue heal very easily after radiumpuncture.

CASE 2

A woman aged 66 was seen during the summer of 1939 for a generalized leucoplakia of the mouth. The most important plaques were situated: (1) in the right gingivo-jugal fornix, (2) inside the cheek, near the right labial commissure, and (3) on the inferior surface of the tongue. The first plaque was ulcerated and cancerized (moderately differentiated epidermoid carcinoma). Radium was applied superficially and the lesion finally decreased and healed partially. Two years later, in 1941, facing incomplete results of healing she was given contact roentgenotherapy. Even then healing was incomplete.

For 3 or 4 years, the patient failed to report but mentioned, in answering our letters, that her mouth remained in a poor condition, but without too much pain. In 1946, she was seen with two carcinomas: one at the right labial commissure and another on the left margin of the tongue. The first one was treated with a radium moulage and the second with radiumpuncture. In 1947, another malignant lesion appeared on a leucoplakia situated at the posterior extremity of the left inferior gum. At the same time, a local regrowth was seen on the right labial commissure treated in 1946.

After 8 years of oral carcinomatosis, a metastatic gland appeared for the first time, in the left cervical region.

The patient died of cachexia with a perforation of the left cheek, on June 11, 1948, after 9 years of illness. Four radiumpunctures, 4 radium moulages, one contact therapy and one series of deep x-ray therapy had been given in all.

CASE 3

On October 21, 1940, a woman aged 50, consulted us about ulcero-granulating tumour situated in the middle of the inferior surface of the tongue close to the left side. A biopsy revealed the presence of a moderately differentiated epidermoid carcinoma. As the tumour was only slightly infiltrative, contact therapy was used and 3,420 r. were given in one sitting. Three months later, the margins of the old ulceration remained suspicious and a second contact therapy was given with a dose of 2,595 r. The patient was seen 6 months after the second treatment, in June, 1941, and healing was still incomplete. A third treatment of 4,700 r. was applied this time.

In November, 1941, a friable papule the size of a pea persisted. This was treated with 2 needles of radium element and a total dose of 3 m.c.d. In April, 1942, the growth was still evident and a new radium puncture was done, with 4 radium needles and a dose of 1,150 mgh. Eight months later, in December, 1942, the superior margin of the lesion was still ulcerated. A new radiumpuncture with 5 m.c.d. was administered.

In July, 1943, an ulceration of one cm. still persisted and its base was indurated. Five needles of 2 milligrams of radium element were inserted and 7 m.c. were destroyed. Nine months later, the patient wrote us that her tongue was not completely healed but that her general condition was improving and that she was suffering less. Fifteen months after the last treatment and 4 years exactly after the first one, we observed for the first time that the patient was clinically cured of her cancer. No local regrowth was noticed and cure was maintained for over 4 years.

There was no evidence of metastatic glands during the whole 4 year evolution of the carcinoma.

CASE 4

On October 25, 1948, a woman aged 67 was seen at L'Institut du Radium with squamous cell carcinoma of the left margin of the tongue. It was the size of a hazel-nut and clinically there were no metastatic glands. Radiumpuncture was applied to the lesion and 10.5 m.c. were destroyed. This was followed by roentgentherapy of the lesion and lymphatics by 12,500 r. at 250 k.v. with 2 mm. copper and 3 mm. aluminum at 80 cm. distance through four ports.

This treatment normally should have given at least local cure; but four months later, last March, a new growth appeared on the anterior border of the treated lesion as demonstrated by a biopsy. A second radiumpuncture of 13.0 m.c. was made and we are awaiting results.

CASE 5

On January 21, 1949, a young girl aged 21, seemingly in good health, came in with a vegetative carcinoma of the middle of the right border of the tongue. The lesion appeared two months previously in a perfectly healthy mouth. As there were no signs of glandular metastases, and in view of the age of the patient we chose the less mutilating form of treatment, which was contact therapy. We gave in one treatment 4,600 r. with rays of a H.V.L. of 0.3 mm. of al, which largely exceeded the lesion.

Here again, we thought we could hope for a local cure. But 2 months later the lesion doubled in size. Roentgentherapy was then prescribed with the following data: 250 k.v., 2 mm. of cu. 3 mm. of al at 80 cm. distance, through the right cheek and a sub-chin portal, 6,000 r. were given over 3 weeks. The lesion seemed now to be apparently under control.*

These five observations make one believe that oral cancer in the female acts differently than in the male. The primary lesion, for a similar histological pattern, is less infiltrative, more radioresistant and far less metastasizing than in the male. As we failed to find in the existing literature any information regarding the special characteristics of oral cancer in the female, we decided to compile the oral cancers treated, at

TABLE I.

| *Age groups* | *Males (1,173 cases)* | *Females (46 cases)* |
|---|---|---|
| | % | % |
| From: 1 to 20 years | 0.1 | 0.0 |
| 21 to 30 " | 1.5 | 2.3 |
| 31 to 40 " | 2.4 | 2.3 |
| 41 to 50 " | 7.6 | 11.4 |
| 51 to 60 " | 24.6 | 25 0 |
| 61 to 70 " | 53.8 | 38.5 |
| Above 70 " | 30.0 | 20.5 |

L'Institut du Radium since its foundation 24 years ago: 2,402 cancers of the mouth and lips were treated. Out of this number 82, which is 3.4%, were encountered in the female.

As regard age, the frequency is not very different for the male and the female.

* Since this paper was written, the lesion has extended and radiumpuncture was done again.

As regards the anatomical area of involvement, there is a striking difference between the sexes. In the male, the first site is the lip with 59.8%, while in the female the tongue is primarily involved (36.4%) and the lip only secondarily (22.8%).

TABLE II.

| *Site of involvement* | *Males (1,173 cases)* | *Females (46 cases)* |
|---|---|---|
| | % | % |
| Lip | 59.8 | 22.8 |
| Tongue | 16.9 | 36.4 |
| Floor of the mouth | 7.3 | 6.8 |
| Gum | 4.4 | 13.5 |
| Tonsils | 2.5 | 9.1 |

Statistics of 3 year cures during a period of 7 years (1939 to 1945) give the following results:

TABLE III.

OF 695 CASES IN MALES

| | *Cases* | % |
|---|---|---|
| Alive and cured after more than 3 years | 328 | 47.1 |
| Dead after a survival of more than 3 years | 44 | 6.5 |
| Dead after a survival of less than 3 years | 255 | 36.8 |
| Lacking information | 68 | 9.8 |

TABLE IV.

OF 28 CASES IN FEMALES
THE SAME PERIOD

| | *Cases* | % |
|---|---|---|
| Alive and cured after more than 3 years | 12 | 40.8 |
| Dead after a survival of more than 3 years | 2 | 7.4 |
| Dead after a survival of less than 3 years | 13 | 48.1 |
| Alive with a cancer in evolution for 13 years | 1 | 3.7 |

These statistics of cure for oral cancer do not demonstrate that the cancer is less malignant in the female than in the male. It is different, however, if we keep in mind that cancer of the lip, which, according to our statistics, heals in the proportion of 72%, represents 60% of oral cancers in the male and only 23% in the female.

If a comparison strictly limited to cancers of the tongue is made, we obtain diametrically opposite results. Of 131 cases of the tongue in males (1939 to 1945) we have the following figures:

TABLE V.

| | *Cases* | % |
|---|---|---|
| Alive and cured after more than 3 years | 18 | 13.7 |
| Dead after a survival of more than 3 years | 12 | 9.2 |
| Dead after a survival of less than 3 years | 93 | 71.0 |
| Lacking information | 8 | 6.1 |

Now, of the 12 cases of the tongue in females, for the same period, the percentage of patients alive and cured after 3 years, was 41.6%, while it was 13.7% in males.

Our inquiry then confirms the opinion that cancer of the oral cavity properly speaking and for an equivalent histopathological pattern, is less infiltrative, less metastasizing and more radioresistant in the female than in the male.

This opens the way to an hypothesis we are trying now to verify that it might be possible to lessen the malignancy of oral cancer in the male, by the administration of female hormones.

4120 Ontario St. E.

## THE NASOPHARYNGEAL RADIUM APPLICATOR IN THE TREATMENT AND PREVENTION OF DEAFNESS

**E. J. Smith, M.D. and E. E. Scharfe, M.D.**

*Montreal, Que.*

IRRADIATION of nasopharyngeal lymphoid tissue is not new. Reports on this form of therapy have appeared in the literature for over twenty-five years. Jarvis[1] in 1923 reported on the effects of small doses of roentgen rays in certain forms of impaired hearing. Other reports followed this but it was not until 1939 that the importance of this subject was really brought to the attention of the medical profession by Crowe and Baylor.[2] Their article on the "Prevention of Deafness" and subsequent articles by the Baltimore group stirred up much interest. They had observed in the course of routine audiometric examination that many children had some loss of hearing for the highest tones of the frequency range. They also observed that hearing frequently returned to normal following tonsillectomy and adenoidectomy. This directed their attention to the nasopharynx and the conclusion was reached that obstruction of the Eustachian tube was responsible for considerable of the ear disease in children. Further studies including routine examination and treatment of many school children also indicated that:

1. Forty per cent of children 8 to 14 years of age show some impairment of thresholds for high tones, *i.e.*, above 2,048. A certain percentage of these children have, of course, lesions other than those secondary to Eustachian tube blockage.

2. Seventy-five per cent of children who have had T. and A. before the age of 12 or 13 will have some

recurrence of lymphoid tissue in the nasopharynx. This tissue frequently recurs in the region of the nasopharyngeal orifice of the Eustachian tube where it is surgically inaccessible.

3. Obstruction due to lymphoid tissue may cause catarrhal changes in the middle ear which are frequently responsible for the early impairment found in children.

4. In contrast to the usual conception of the type of hearing loss in catarrhal otitis media, the high tones and not the low tones are usually impaired first. Later all tones may become involved.

5. Irradiation of this lymphoid tissue is an effective method of treatment.

6. Children who have impairment of hearing for all tones derive the most benefit from irradiation treatment.

Crowe and his co-workers believe that the normally occurring or recurring nasopharyngeal lymphoid tissue under the stimulation of repeated infections or allergy enlarges in size and if it is located in or near the nasopharyngeal orifice of the Eustachian tube, some degree of obstruction occurs. The obstructing mass interferes with the ventilation of the middle ear and the maintenance of normal pressure therein. The absorption of some of the contained air results in a middle ear pressure chronically less than atmospheric. The pressure difference itself may cause a slight impairment of hearing but the important result is mucosal hyperæmia and œdema. If the condition persists, mucosal hyperplasia and fibrosis develop. If fibrosis is present the changes are irreversible and treatment will not restore the hearing to normal but may prevent further increase in hearing loss.

Further interest was aroused in this subject in World War II when aerotitis became a problem of some magnitude in flying personnel of the United States Army. The Army Air Force aerotitis control program was formulated in 1944. The otologists participating in this program recommended irradiation of lymphoid tissue of the nasopharynx. Over 14,000 individual treatments were given 6,881 men, and the results reported by the otologists participating.[3] Later Fowler[4] reported on the findings in 80 airmen who had been treated by radon or radium. He claims that 69% of those properly selected obtained relief from symptoms.

The biologic effect has been studied by Schenk[5] who reported his findings in lymphoid tissue that had been irradiated. His material was obtained by biopsy at intervals of two weeks, four weeks, and six months after treatment. Control specimens were taken also before irradiation. He reports that in two and four weeks, the adult lymphocytes were but little affected, while the young lymphocytes showed marked nuclear disturbances or complete degeneration. The germinal centres disappeared and were not again present at six months although there was reappearance of lymphocytes indicating regeneration of the follicles and therefore some increase in size of the lymphoid mass. This tendency of the lymphoid follicle to regenerate had been noticed by others. He also noted the apparent increase in the number of lymph channels and commented that the accompanying increased blood supply was an additional factor in the reduction of existing œdema and further speculated that disturbance of lymphatic flow may be a factor in producing the middle ear changes. Crowe[6] has remarked that the effect of irradiation is to prevent mitosis in the germinal centres, thus stopping the formation of new lymphocytes. This results in a gradual shrinking of the lymphoid mass which does not recur to such a large extent. It is this regeneration of the follicle that necessitates, in some patients, further irradiation after the initial treatment has been given.

Since this work was first reported, changes have been made not only in the type of filter but also in the type of radioactive substance. The purpose of screening, or filtering radium emanations is to remove the longer wave-length beta rays. Various metals have been tried, *i.e.*, platinum, brass and monel metal. The first of these screens out all the beta rays, the second allows 7 to 8% beta to pass, while the third allows approximately 75% of the beta through. The applicator in most popular use at present contains 50 mgm. of radium sulphate. This is enclosed in a monel metal tubular chamber, 15 mm. in length with an inside diameter of 1.7 mm., a wall thickness of 0.3 mm., and an outside diameter of 2.3 mm. This filter allows both beta and gamma radiation in the proportion of approximately 80% beta and 20% gamma. This container is screwed to a metal handle, making the total length 18 cm. The diameter of the radium containing chamber is sufficiently small to enable it to be easily passed along the floor of a child's nose. Approximately 75% of the beta rays are absorbed in the first three millimetres of tissue. At a distance of 2 cm., only about 6 to 7% of the beta rays are detectable. When the applicator is used on one side of the nasopharynx, the effect on the opposite side is negligible.

Perusal of the literature shows that the technique has varied considerably in the past decade. The most obvious change has been to increase

the dosage and shorten the time between treatments. Crowe and Baylor[2] in one of their articles state "It is better to give repeated small doses at intervals of a month or six weeks than to risk the irritation and œdema that follow an overdosage". In a more recent article Proctor, Polvogt and Crowe[7] recommend using the 50 mgm. monel metal radium applicator for twelve minutes on each side. Two additional treatments are given at intervals of two weeks and they also state that the course of treatment may be repeated once or twice at intervals of one year if symptoms recur.

Our standard technique to date has been to use the 50 mgm. monel metal applicator 8½ minutes on each side. Three treatments are given at intervals of 2 or 3 weeks (usually two weeks). Proctor[8] outlines the following points in technique:

1. The applicator should be left in the lead cylinder until one is ready to insert it into the patient's nasopharynx. A lining tube of glass may be fitted into the hole in the lead cylinder and kept filled with 95% alcohol, which is a convenient means of sterilizing the applicator. Heat must never be used.
2. The patient should lie comfortably on a couch during the treatment.
3. The alarm time clock should be used to control the duration of the treatment.
4. Remove the applicator from the lead cylinder, wash off the alcohol with water, dip into a lubricant (one that is water soluble so that it may be quickly washed off at the conclusion of the treatment) and insert into the nasopharynx.
5. Exact placing of the applicator is most important. The middle (not the end) of the radium-containing chamber should be in direct contact with the tissue in the fossa of Rosenmuller or the orifice of the Eustachian tube. The exact location and the depth from the external nares to the area to be treated can be determined only by a preliminary examination with the naso pharyngoscope in one side of the nose and a calibrated rod or applicator in the opposite side. Never bend the applicator in order to put it in the Eustachian tube, since this may lead to leakage of the radon. When it is in place, fix it with suitable clamp or adhesive.
6. The most important protection for personnel using the radium is distance. During the treatment, all personnel who are constantly handling the applicator should be at a distance of 25 or 30 feet (7.5 or 8 metres).
7. At the conclusion of the treatment, the mucus adhering to the applicator should be removed with a brush fixed to the table or sink and the applicator quickly replaced in the lead cylinder. The radium carrying chamber at the end of the applicator must never be touched. If the applicator is repeatedly cleaned by wiping with gauze held in the hand, radiation changes will soon become evident in the skin and the nails. The applicator should always be held at the end of the handle and away from the body. The placing of the applicator should be done rapidly, and when treatment is completed the applicator should go back into the cylinder immediately.

*Potential dangers.* — Numerous articles in medical literature and also articles in the public press have created the impression that this is a perfectly safe method of treatment. The result has been a tendency to employ irradiation of the nasopharynx as a therapeutic trial without a proper evaluation of the case, and more important still, a proper evaluation of the potential danger of any form of irradiation therapy. There has also been a tendency to increase the dosage in an effort to improve the results.

No untoward results following irradiation of the nasopharynx have been published to date but we must remember that sufficient time may not have elapsed for late damage to become apparent. Schulz and Robbins[9] stress the fact that although no untoward results have been reported from this form of therapy the present procedure of using the 50 mgm. radium applicator for twelve minutes, thereby giving a dosage of 600 mgm. minutes or 10 mgm. hours to each side on several occasions is not without danger. Late irradiation damage has been observed following approximately equivalent dosage for benign lesions in other parts of the body. They therefore emphasize the following points:

(1) No more than an erythema dose should be given at one treatment. As determination and calculation of dosage from radium applicators are somewhat inaccurate they suggest that the operator should determine the erythema dose for his applicator by applying it to his own arm for varying periods of time. (2) This method should not be made a routine procedure or a routine part of an operative procedure and the natural urge to increase the dosage should be avoided.

Some otologists and radiologists claim that the dangers are exaggerated by these authors. We believe, however, that the paper by Schulz and Robbins should be read by any physician who uses or contemplates using irradiation therapy in the treatment of benign lesions.

*Results of irradiation treatment.* — Polvogt[7] recently reported on a series of 282 private patients suffering from impaired hearing which was considered to be due to Eustachian tube obstruction. In this series 85% received great and lasting improvement in hearing. Crowe, Proctor *et al.*[7] reported on a series of 600 children. Re-examination after about six years showed that more than half of the treated children, with original losses of 25 to 35 db. for all tones had normal or near-normal hearing. In another group of 400 cases these authors found that hearing improvement followed irradiation in about half the patients. This latter group also showed considerable reduc-

tion in the incidence of upper respiratory infection and recurrent acute otitis media.

A series of cases of chronic suppurative otitis media was also treated with radium. There was no improvement in about one-third of these cases, while the remainder showed either a dry ear or a healed perforation.

As previously mentioned good results were reported by the otologists participating in the Army Air Force Aerotitis Control Program.[3]

In our clinic approximately 50 cases have had irradiation therapy. We have been able to secure fairly adequate follow-up on 42. There were 28 cases of Eustachian tube obstruction of which 22 were children (under 13) and six were adults. The remainder of the series consisted of seven cases of mixed deafness and seven of chronic suppurative otitis media. In the cases of deafness attributed to Eustachian tube obstruction are several in whom there was possibly a degree of perceptive deafness or even early otosclerosis. The deafness of all was however, predominantly conductive.

We will first review the 22 cases of Eustachian tube obstruction in children (see Table I). The ages of these children varied from 5 to 13 years. The chief complaint was persistent or recurrent deafness. This was aggravated in many cases by acute upper respiratory infection and also by attacks of acute catarrhal or suppurative otitis media. The duration of symptoms varied from four months to ten years, the average being 2.8 years.

All except three had had tonsillectomy and adenoidectomy prior to being seen by us. Five still had obviously enlarged adenoid tissue and surgical adenoidectomy was performed before irradiation. The interval between the first visit and the first irradiation treatment was in most cases 1 to 3 months. During this interval other forms of therapy such as inflation, adenoidectomy, etc., were used.

The dosage used in most cases was 50 mgm. for 8½ minutes to each side of the nasopharynx. A few had exposures of 9 to 12 minutes. Three cases had only two treatments as this dosage was found sufficient to relieve symptoms. All other cases had three treatments at intervals of two to three weeks. In only one case was a second course given.

As the deafness was unilateral in one case, 43 deafened ears were treated in this group. We have chosen to place in the normal or near-normal group, those with 10 db., or less, average loss for the speech frequencies. With this arbitrary standard in mind we find that before irradiation there were 8 affected ears (18.6%) in this group, whereas after irradiation there were 29 affected ears (67.4%). All ears except three

TABLE I.

CASES OF EUSTACHIAN TUBE OBSTRUCTION

| Age | Symptoms and duration | T. and A. | Radium and other treatment | Average db. gain: Below speech frequencies | | Speech frequencies | | Above speech frequencies | | Average db. loss for sp. freqs. at last test | | Follow-up post-radium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | Df. foll. rec. ac. ot. m. 1 yr. | No | 3x8½′ | R 22 | L 11 | R 11 | L 34 | R 31 | L 48 | R 14 | L 6 | 1 mo. |
| 10 | Df. foll. rec. ac. ot. m. 2 yrs. | Yes | 3x8½′ | 5 | 8 | 10 | 10 | 11 | 5 | 6 | 12 | 2 yrs. |
| 10 | Rec. ac. ot. m. 9 yrs. | Yes | 3x8½′ | -10 | -3 | 0 | 13 | 15 | 17 | 3 | 12 | 1 yr. |
| 12 | Rec. df. with colds. 1 yr. | Yes | 3x8½′, + 1 | 0 | 6 | 6 | 3 | 25 | 18 | 8 | 12 | 16 mos. |
| 8 | Rec. ac. ot. m. 2 yrs. | Yes | 3x8½′, + 1 | 0 | -8 | 12 | 0 | 30 | 12 | 3 | 15 | 1 yr. |
| 12 | Rec. earache and df. 5 yrs. | Yes | 3x8½′ | -2 | 0 | 5 | 6 | 18 | 25 | 3 | 0 | 21 mos. |
| 6 | Rec. ac. ot. m. supp. 4 yrs. | No | 3x8½′, (4 mos. after T. and A.) | 2 | 10 | -2 | 8 | -3 | 10 | 15 | 5 | 9 mos. |
| 12 | Rec. ac. ot. m. supp. 10 yrs. | Yes | 3x8½′, + ad. | 27 | 15 | 20 | 29 | 18 | 32 | 13 | 2 | 14 mos. |
| 13 | Rec. df. left ear. 2 yrs. | Yes | 2x12′, 1x8½′ | 0 | 20 | 12 | 40 | 20 | 25 | 1 | 8 | 6 mos. |
| 5 | Painless df. 6 mos. | No | 2x9′, (foll. T. and A.) | Before radium heard w.v. at 14″ | | | | | | W.v. at 20″ R, L. | | 13 mos. |
| 12 | Rec. df. with colds. 2 yrs. | Yes | 2x9′ | 3 | 3 | 0 | 4 | 0 | 25 | 2 | 6 | 4 mos. |
| 6 | Rec. df. with colds. 4 mos. | Yes | 3x8½′ | 12 | 2 | 4 | 6 | 37 | 10 | 22 | 22 | 1 mo. |
| 9 | Df. made worse by colds. 4 mos. | Yes | 3x8½′, x2, ad. | 7 | 0 | 1 | 0 | 2 | 0 | 30 | 0 | 1 yr. |
| 6 | Df. made worse by colds. 2 yrs. | Yes | 3x8½′, + ad. | 20 | 18 | 22 | 25 | 28 | 35 | 0 | 6 | 2 mos. |
| 5 | Df. made worse by colds. 1 yr. | Yes | 3x8½′, + ad. | 22 | 30 | 20 | 25 | 20 | 20 | 36 | 16 | 6 wks. |
| 5 | Rec. ac. ot. m. and df. 2 yrs. | Yes | 2x11′ | 13 | 13 | 18 | 8 | 27 | 8 | 8 | 10 | 7 mos. |
| 7 | Rec. sore throat, df. 18 mos. | Yes | 3x8½′ | -10 | 0 | 12 | 8 | 12 | -5 | 6 | 8 | 1 mo. |
| 12 | Rec. df. with colds. 1 yr. | Yes | 3x8½′ | 17 | 28 | 32 | 29 | 32 | 22 | -5 | -2 | 3 mos. |
| 6 | Rec. df. with colds. 2 yrs. | Yes | 3x8½′ | 27 | 27 | 25 | 28 | 40 | 37 | 5 | 5 | 7 mos. |
| 8 | Rec. df. with colds. 2 yrs. | Yes | 3x8½′, + ad. | -2 | 34 | 11 | 24 | 14 | 15 | -6 | 10 | 2 mos. |
| 10 | Rec. df. with colds. 2 yrs. | Yes | 3x8½′, + ad. | 20 | 22 | 28 | 30 | 34 | 52 | 3 | 3 | 4 mos. |
| 11 | Rt. cat. ot. with fluid. 6 mos. | Yes | 3x8½′ | 0 | -6 | 0 | -5 | -8 | 0 | 13 | 5 | 5 mos. |

Key:—

Df. —deafness
Rec. —recurrent
Ac. ot. m.—acute otitis media
Cat. ot. —catarrhal otitis
Ad. —adenoidectomy
T. and A.—tonsillectomy, adenoidectomy

or four showed some improvement. In some cases the gain was not sufficient to be able to say definitely that it was due to the treatment. However, 24 ears or (55.8%) showed at least a 10 db. improvement for the speech frequencies. Fourteen ears did not return to the above standard of normal or near-normal hearing. In several of these it is possible as previously mentioned that the deafness may not have been entirely due to Eustachian tube obstruction. In others we can only assume that due to the long duration of the condition the changes in the middle ear had become irreversible. The clinical response with especial reference to incidence of colds and the effect of colds on hearing was very encouraging. Only seven reported some mild deafness with colds. The follow-up period varied from one month to two years but in most cases was less than one year. We are quite aware that this is not a sufficiently long period in which to properly evaluate the treatment and must consider this as a preliminary report.

*Mixed deafness* (Table II).—Seven cases of mixed deafness were treated with radium as it was felt that all had some degree of tubal obstruction present and we thought that we could perhaps protect the ears from further deterioration of a conductive nature. The duration in all was of several years and all had had tonsillectomy and adenoidectomy. Adenoidectomy when indicated, was performed. The audiometric response, with one exception, was rather poor, while three reported less effect on hearing from colds. The follow-up periods have all been too short and perhaps longer observation may reveal more benefit than is apparent now.

*Chronic suppurative otitis media* (Table III).—Twelve chronically suppurating ears were treated. With one exception, all patients were adults. The duration of symptoms varied from six months to many years. Tonsillectomy and adenoidectomy had been done on three and further surgical treatment was done where indicated. With one exception audiometric improvement was insignificant. When last seen, five ears were dry and two had intact drums. The follow-up period varied from 3 months to 21 months, the average being 10.5 months.

*Irradiation treatment in adults.*—Exclusive of the cases of chronic suppurative otitis media, only eight adults have been treated. Two of these have already been mentioned in the "mixed deafness" group. There was one case with a history very suggestive of aerotitis. Since her course of treatment, however, this patient has not done any flying so the result of treatment is unknown. The other five were cases of either persistent or recurrent catarrhal otitis media with obvious fluid in the middle ear. The ages varied from 41 to 64 years. Two of these five patients had no history of previous ear trouble and were seen soon after the onset of deafness. No permanent results followed three to four weeks of conservative treatment although there was temporary improvement following repeated Eustachian tube inflations. In both of the above cases the catarrhal otitis media cleared up and hearing returned practically to normal following three irradiation treatments. These two cases were treated eighteen months and two years ago respectively. There has been no recurrence as yet

TABLE II.
CASES OF MIXED DEAFNESS

| | | | | | | Average db. gain | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Below speech frequencies | | Speech frequencies | | Above speech frequencies | | Average db. loss for sp. freqs. at last test | | | | | | | |
| *Age* | *Symptoms* | *Duration* | *T. and A.* | *Interval 1st visit -rad.* | *Radium and other treatment* | R | L | R | L | R | L | R | L | *Clinical response* | *Follow-up post-rad.* |
| 12 | Df. worse with colds | 3-4 yrs. | Yes | 1 mo. | 3-8½ | -9 | 10 | 0 | 0 | 3 | 6 | 34 | 38 | None | 3 mos. |
| 13 | " | 2 yrs. | Yes | 3 mos. | " + ad. | 2 | 2 | 4 | 0 | 1 | -2 | 28 | 36 | None | 1 mo. |
| 16 | Df. sc. f. worse with colds | 14 yrs | Yes | 2 mos. | " | 2 | -11 | 7 | 4 | -1 | 4 | 35 | 34 | Less effect from colds | 2 mos. |
| 5 | Df. worse with colds | 2 + yrs. | Yes | 1 mo. | " + ad. | 7 | 17 | 23 | 14 | 18 | 12 | 35 | 26 | Less effect from colds | 6 wks. |
| 6 | Df. sl. worse with colds | 3 yrs. | Yes | 3 mos. | " + ad. | 5 | 11 | 8 | -21 | -6 | -5 | 42 | 44 | " ? No audio impr. | 2 mos. |
| 8 | " | 5 yrs. | Yes | 1 mo. | " + ad. | 3 | 1 | 0 | 0 | 23 | 0 | -7 | 7 | Little clinical benefit | 3 mos. |

in either case. The other three cases had had previous attacks of catarrhal otitis media for periods of one to two years. All showed definite improvement of hearing following inflation but none of them showed any improvement following three irradiation treatments. All three still have persistent or recurrent catarrhal otitis media. The duration of each treatment was 8½ minutes. There might have been improvement if we had used more intensive irradiation. It would not be justifiable to draw conclusions from the results of such a small series, but would appear that the prognosis is at least partly dependent on the age of the patient and the duration of the symptoms.

*Clinical application.* — It is agreed by most authors that irradiation is undoubtedly of value in reducing lymphoid tissue in or around the nasopharyngeal orifice of the Eustachian tube. This, in a certain percentage of cases, has a beneficial effect on middle ear lesions. It must be remembered, however, that this form of treatment is not without potential danger and should not be used indiscriminately. The indications for its use should therefore be clearly defined and the following points stressed:

(1) The diagnosis of Eustachian tube obstruction depends upon the signs and symptoms uncovered by a careful history and thorough examination. The positive findings in the history will depend upon the degree of obstruction of the tube. A marked degree of obstruction frequently leads to attacks of acute otitis media and occasionally long continued discharge after such acute episodes. Lesser degrees of obstruction cause a slowly progressive painless deafness, almost invariably made worse by acute upper respiratory infection. This deafness may advance to such an extent that the child is labelled as dull, backward, or refractory in school. The signs indicating Eustachian tube obstruction are: (*a*) deafness as shown by audiometry; (*b*) tympanic membrane changes which are always present. These may be dullness, opacity, retraction, hyperæmia of middle ear, bluish discoloration, or fluid in middle ear as indicated by fluid level or bubbles; (*c*) abnormal Eustachian orifices. These should be visualized if at all possible with the electric nasopharyngoscope.

TABLE III.
CASES OF CHRONIC SUPPURATIVE OTITIS MEDIA

| *Age* | *Ear affected* | *Duration* | *U.R.I.* | *Interval 1st visit -rad.* | *Radium* | *Average db. gain* — *Below speech frequencies* R | L | *Speech frequencies* R | L | *Above speech frequencies* R | L | *Clinical responses* | *Follow-up post-rad.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Lt. | 10 yrs. | No | 1 yr. | 3-8½'. | | | | | | | No clinical benefit. | 1 yr. |
| 11 | Bil. | 3 yrs. | No T. and A. + | 1 yr. | " + ad. | -13 | -1 | 7 | 21 | 7 8 th | 22 NH, RL | Rt. intact, dry for past 6 mos., lt. continual disch. | 1 yr. |
| 9 | Rt. | 6 mos. | No T. and A. + | 14 mos. | " | 10 | 2 | 13 | 0 | 6 | -3 | Fewer colds with no effect on hearing; rt. perf, scanty disch. | 1 yr. |
| 16 | Bil. | 1 yr. | No T. and A. + | 6 mos. | " | 3 | 18 | 18 | 19 | 45 | 32 | No disch. reported. Rt; dry, perf. lt, intact, slightly red, moist. | 1 yr. 9 mos. |
| 22 | Bil. | Since childhood | No | 1 mo. | " | | | | | | | Freq. mid. ear disease. Final; Lt. dry perf. Rt. intact. | 3 mos. |
| 19 | Bil. | Many years | Chr. tonsillitis | 1 mo. | " | | | | | | | Lt; dry perf. Rt, perf., scanty disch. Colds do not affect ears as much as before. | 5 mos. |
| 48 | Bil. tinnitus | Many years | " | 2 wks. | " | 5 | -7 | 2 | 4 | NH | 10 | Both have remained dry. Hearing does not change with colds. | 4 mos. |

Key:—
U.R.I.—Upper respiratory infection, sinusitis, etc.

2. Irradiation of nasopharyngeal lymphoid tissue does not replace a properly performed adenoidectomy. If adenoid tissue is of appreciable size and surgically accessible, adenoidectomy should be the first step in treatment.

3. Other possible causes of Eustachian tube obstruction, such as sinusitis, allergy, etc., should also be considered.

4. Deafness due to Eustachian tube obstruction frequently clears up under conservative treatment and this should be attempted before seriously considering irradiation. Boies[10] in reporting a series of cases, allowed a minimum interval of one month between the date of onset of the deafness and the irradiation. This period may be well employed in investigating other

possible causes of the deafness and also in employing more conservative measures.

5. An attempt should always be made to test tubal patency. Farrior[11] uses the Valsalva manœuvre with the mercury manometer and also attempts to ascertain if the obstruction is central (nasopharyngeal orifice) or peripheral (lateral to nasopharyngeal orifice). The Valsalva manœuvre as described is not entirely reliable in determining the degree of Eustachian tube obstruction, as certain individuals with normal hearing cannot inflate their ears by this method even with very high pressure. The majority of normal Eustachian tubes however, can be opened by this method and so we believe it is worthy of consideration.

However, even if quantitative estimation of tubal patency cannot be made, inflation should be carried out by catheterization or politzerization and the effect on hearing noted. This may not be feasible in young children but should at least be attempted. If the hearing does not improve following inflation it would not seem reasonable to expect improvement following irradiation. In these cases if there are middle ear changes and lymphoid hyperplasia in or about the nasopharyngeal orifice of the Eustachian tube, irradiation may be considered justifiable in an endeavour to prevent further hearing loss.

SUMMARY

Irradiation of nasopharyngeal lymphoid tissue has a definite place in the restoration of the patency of the Eustachian tube. This is followed in many cases by improvement in hearing. The degree of success of the treatment is at least partly dependent on the age of the patient and the duration of the symptoms. This form of therapy is not without potential danger and should not be used in deafness other than that due to Eustachian tube obstruction.

REFERENCES

1. JARVIS, D. C.: *Am. J. Roentgenol.*, **10**: 201, 1923.
2. CROWE, S. J. AND BAYLOR, J. W.: *J. A. M. A.*, **112**: 585, 1939.
3. The Use of Radium in the Aerotitis Control Program at the Army Air Forces: A Combined Report by the Officers Participating, *Ann. Otol. Rhin. & Laryng.*, **54**: 649, 1945.
4. FOWLER, E. P. JR.: *Arch. Otolaryng.*, **43**: 1, 1946.
5. SCHENCK, H. P.: *Laryngoscope*, **51**: 780, 1941.
6. CROWE, S. J.: *Ann. Otol. Rhin. & Laryng.*, **55**: 779, 1946.
7. PROCTOR, F., PALVOGT, L. M. AND CROWE, S. J.: *Bull. Johns Hopkins Hos.*, **83**: 383, 1948.
8. PROCTOR, D. F.: *Arch. Otolaryng.*, **43**: 473, 1946.
9. SCHULZ, M. D. AND ROBBINS, L. L.: *Trans. Am. Acad. Ophth. & Otolaryng.*, January and February, 1949.
10. BOIES, L. R.: *Arch. Otolaryng.*, **44**: 129, 1946.
11. FARRIOR, J. B.: *Arch. Otolaryng.*, **48**: 221, 1948.

Medical Arts Bldg.

## CARCINOMA OF THE UTERUS*

**Deward O. Ferris, M.D.**

*Division of Surgery, Mayo Clinic, Rochester, Minn.*

RECENT statistics show that carcinoma develops in the uterus more frequently than in any other organ or part of the female body. Statistics also show that more women die as a result of carcinoma of the uterus today than previously. In 1946,[1] 17,205 women died in the United States from uterine cancer. This is a real increase, not just an apparent one over the number ten years earlier.

In 3,799 of the 5,377 cases in which carcinoma of the uterus was treated at the Mayo Clinic from 1910 to 1944, inclusive, the lesion was primary in the cervix and in 1,578 in the fundus.[2] The ratio of carcinoma of the cervix to carcinoma of the body of the uterus in this series is 2.4:1. More than 90% of the cervical carcinomas were squamous-cell epitheliomas and more than 90% of the carcinomas of the body of the uterus were adenocarcinomas. In this paper I shall confine my remarks chiefly to the commonest type of lesion in each instance. Of course, there are other malignant lesions of the uterus, namely, chorio-epithelioma, myosarcoma and sarcoma of the endometrium, which will not be discussed here.

The extensive educational program of the last twenty years has done a great deal to help the laity recognize the early signs of this disease. A large percentage of the laity now knows that abnormal vaginal bleeding or vaginal discharge requires investigation. When women present themselves with these symptoms, what do we find?

Maliphant[3] observed that carcinoma of the uterus was in an advanced stage in 60% of women seen six months after the onset of spotting and in 50% of those examined only three months after the onset of spotting. At the Mayo Clinic, the lesion was limited to the cervix in only 114 (16.8%) of 677 new cases of epithelioma of the cervix treated in the years 1940 to 1944, inclusive. Thus, lives are lost because the presence of cancer may not even be suspected until the disease is well advanced.

* Read before the Eighteenth Annual Meeting of the Canadian Medical Association, in General Session, Saskatoon, June 16, 1949.

All are agreed, regardless of the type of treatment which they advocate, that early diagnosis offers the greatest hope of cure. It is, therefore, important to consider seriously the earliest histologic changes which justify a diagnosis of cancer. Fine changes which should point clearly to an early cancer are ignored by some pathologists, whereas squamous metaplasia, a purely benign process, is erroneously considered cancer by others (Figs. 1 and 2).

In 1912, Schottaender and Kermauner[4] called attention to a "carcinomatous coating" adjacent to invasive carcinoma. In 1927, Schiller[5] published a series of articles in which he presented evidence which he thought indicated that the carcinoma-like changes in the surface epithelium actually indicate cancer in the pre-invasive stage. In 1932, Broders[6] described carcinoma *in situ* as a condition in which malignant epithelial cells are found in or near positions occupied by their ancestors. They have not migrated beyond the juncture of the epithelium and connective tissue which is the so-called basement membrane (Fig. 1).

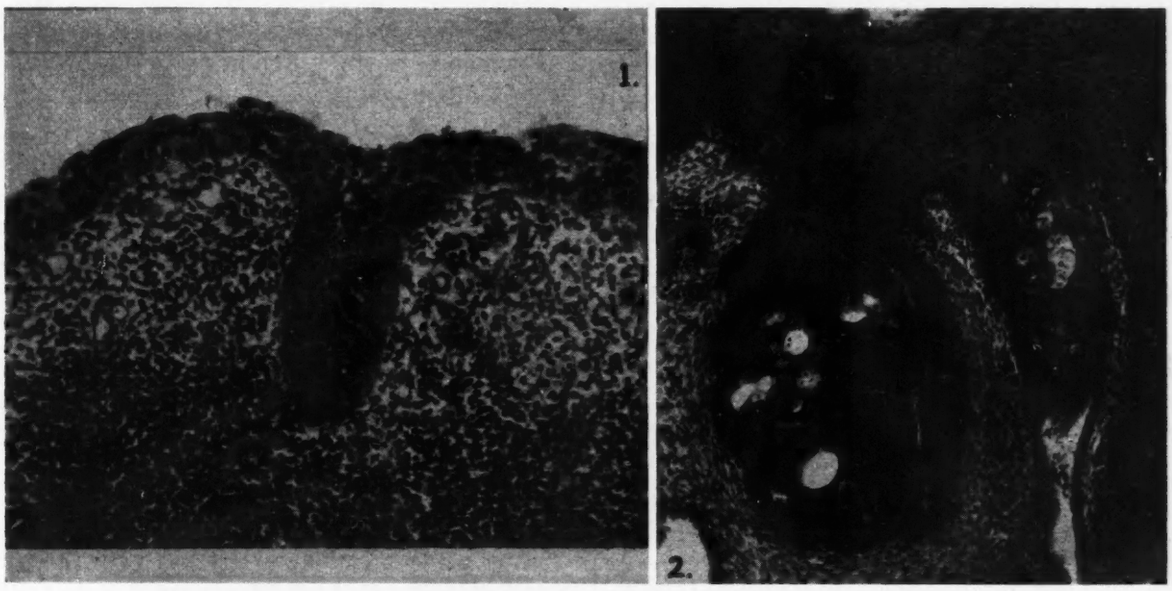



**Fig. 1.**—Squamous-cell carcinoma *in situ* of the uterine cervix, in which the carcinomatous cells have replaced the normal cells and are appearing to function in a protective manner. There is no penetration of the so-called basement membrane; therefore, according to older teachings, the lesion would be considered noncarcinomatous, or at most only precarcinomatous. **Fig. 2.**—Squamous metaplasia with a pattern simulating invasion, but the individual cells definitely are not malignant.

Benign penetrating epithelium is characterized by nonmalignant hyperplasia (Fig. 2). The epithelial cells in this condition, although they may penetrate far below the normal level of the basement membrane and may be greatly increased in number, have retained the characteristics of normal epithelial cells. This is observed in healing wounds and chronic ulcers.

The day has passed when epithelium can be considered noncarcinomatous because it is within the confines of the basement membrane and, conversely, carcinomatous because it has penetrated beyond this barrier. It is, therefore, imperative that the microscopist take into consideration the character of the epithelial cells above everything else in order to arrive at a correct diagnosis.

With this knowledge of carcinoma *in situ* it is now recognized that cancer of the cervix may exist for months or years before the appearance of either symptoms or signs. The average age at which cervical cancer appears is known to be 48 years. Te Linde and Galvin[7] found 36 years to be the average age for the appearance of carcinoma *in situ*. Thus it seems logical to assume that carcinoma of the cervix may be present for years before there is clinical evidence of its presence. In support of this assumption, Schiller has reported 3 cases which he encountered, in which repeated biopsies over a period of sixteen months, eighteen months and nine years, respectively, showed lesions *in situ*. But one never knows just when carcinoma will begin its invasion. Te Linde[8] mentioned a case in which a trachelorrhaphy was performed in 1919. In 1921 the

cervix was normal; in 1928 the patient had advanced cervical cancer. The tissue previously removed in 1919 was then re-examined and found to be carcinoma *in situ*.

It is impracticable to obtain repeated specimens for biopsy from symptomless women. The vaginal smear, on the other hand, is technically simple to procure. It is known that all epithelial surfaces desquamate cells. It also is known that this holds true whether the surface is normal epithelium, carcinoma *in situ* or invasive carcinoma. In fact, there is evidence[9] that malignant cells desquamate more readily than the normal cells and that they can be identified in the desquamated material. If the technique can be so developed that sufficiently accurate results are obtainable, the vaginal smear should offer a means of detecting cervical cancer earlier than can be practically accomplished in any other way.

In 1928, Papanicolaou demonstrated his ability to make a diagnosis of carcinoma of the uterus by the observation of single malignant cells cast off from the tumour into the vaginal secretion. Subsequently, in 1941 and 1943, Papanicolaou and Traut published articles and also a monograph describing their experiences. In 1943, Meigs and others,[10] confirming the work of Papanicolaou, reported a series of cases studied at the Massachusetts General Hospital and in 1945, in a second article,[11] gave convincing evidence of the value of the method.

It is obvious to those who are interested in uterine cancer that this method is of extreme value in enabling the physician, if not to make a definite diagnosis, at least to screen satisfactorily women who come for routine examination. If cancer cells are found on examination of the smear, further studies, both by smear and biopsy, are necessary. If no evidence of malignant disease is found on examination of the smear, this result indicated merely that at the time cancer cells were not found on the slide. In spite of this negative result if the patient's symptoms or the appearance of the cervix is suggestive of a lesion, further studies, including biopsy, must be undertaken. Without corroboration by other means, the finding of cancer cells in the vaginal smear is not sufficient evidence for radical surgery.

The real value of the vaginal smear is the ease with which it can be made by general practitioners in their offices. It is taken by means of a small glass tube and a rubber bulb. The tube is placed in the vagina with the bulb compressed, the bulb is then released and the vaginal secretion removed by suction. The secretion is then blown on a glass slide, spread out with the tip of the glass tube to make a good film and then placed immediately in a solution of ether (1 part) and 95% alcohol (1 part). Smears may remain in the fixative two to three weeks without showing any signs of deterioration. It is important that the slide be placed in the fluid immediately after the secretion has been placed on the slide so that the maximal benefit of fixation may be secured. These slides must then be reviewed and interpreted by a pathologist who has had special training in cytologic diagnosis, rather than by a pathologist who bases his diagnosis on a study of architecture of the tissue.

In Meigs'[12] series of 2,749 cases are included 329 cases of cancer. In 25 of these, either carcinoma was unsuspected before a vaginal smear was taken or the vaginal smear was of great aid in the primary diagnosis.

This method should be of tremendous value in the routine screening of patients in the office or clinic. I want to emphasize again that the *in situ* lesion exfoliates malignant cells just as much as an invasive lesion, and the diagnosis of malignant lesion is just as easily made from the smear when an *in situ* lesion is present. I believe every province or state should have at least one capable cytologist familiar with the smear method of diagnosis.

For many years Huggins and his associates[13] have been working hard in cancer research. In March of this year they reported their work on thermal coagulation of serum proteins. This test may prove to be a simple, reasonably sure test for cancer. I quote a summary in their own words:

> "Frequently in human cancer the serum proteins are qualitatively abnormal in that, as compared with normal serum, cancer serum coagulates less well. The simple determination of the lowest concentration of proteins which can coagulate provides useful information in recognition of the presence of cancer in man. The iodoacetate index is another quantitative device for recognition of the abnormality of serum protein permitting the over-all coagulative defects to be expressed in mathematical form.
>
> "It must be emphasized that determination of the lowest coagulable protein concentration and the iodoacetate index are not specific tests for cancer. While in most cases of human cancer there is a qualitative defect in the proteins of serum which may be identified by the thermal coagulation tests, the defect is not specific and

reactions similar to that in cancer are obtained in the presence of pulmonary tuberculosis and some acute massive inflammatory processes as well. The phenomena of deficient coagulation imply only that *the serum albumin is abnormal.* One cannot say on the basis of these tests that a given patient has or does not have cancer. The determination of thermal coagulability of the serum proteins has use as a rough screen in that marked deviations from the normal mean that a patient usually (always?) has serious pathology; the nature of the disease must be determined in other ways.''

This, to me, is a real achievement and is probably the greatest single blow yet delivered in the fight against cancer. Some day, we hope soon, we will have a test for cancer which is as simple as the test for syphilis is today.

When the diagnosis of carcinoma of the uterus is accurately made by microscopic study of material removed for biopsy, permanent cure can be obtained only by radical and effective treatment. The type of treatment and the ultimate result of such treatment will depend not only on the extent of the disease but also, in a large measure, on the grade of malignancy present. The work on grading, as described by Broders,[14] taking into consideration chiefly the differentiation of the tumour cells, has been of great prognostic value. He has graded carcinomas as 1, 2, 3 and 4, grade 4 being the most malignant. The clinical classification of epithelioma of the cervix, based on that of the Health Organization of the League of Nations[15] which describes four stages, is a great help in tabulating or differentiating lesions. However, the physicians must not be misled by fixation or infiltration in the broad ligaments, as this may be the result of coexisting inflammatory disease or endometriosis. The stage of the growth is, no doubt, of great importance from a prognostic standpoint and as a means of helping to decide on the type of treatment, but it does not represent as good a guide to the ultimate outcome as the histologic appearance of the tumour cells.

Let me consider first squamous-cell epithelioma of the cervix. If the patient has a fair prospect of cure, the treatment should be either removal of the epithelioma by one skilled in the procedure of radical hysterectomy or radium treatment by one experienced in radium therapy, or a combination of these. The choice will depend on the stage and microscopic appearance of the lesion under consideration, the age of the patient, the duration of the disease and the probable difficulties and dangers of removal. In general, a cervical epithelioma of stage I in a young woman who is not obese and who is in good general condition, probably is best treated by Wertheim hysterectomy followed by irradiation.

The reasons for Wertheim hysterectomy are as follows: (1) If the cervix is removed, there is no chance for recurrence in it or for the later development of an entirely new carcinoma of the cervix. (2) Certain carcinomas of the cervix are resistant to radiation, a fact proved by Meigs and his associates. (3) There will be less damage to adjacent structures by surgery than by radiation therapy. (4) Bonney and Taussig have shown that metastatic lesions in the lymph node deep in the pelvis can be cured by surgical procedures and I believe it is almost impossible with irradiation to cure cancer in lymph nodes deep in the pelvis.

In the Wertheim hysterectomy which we perform, the uterus with as much parametrium and vagina as possible, both tubes and ovaries, and all nodes from the common iliac artery to the obturator foramen are removed. These nodes include the iliac, hypogastric, obturator and ureteral nodes. It is a long, tedious dissection but one fairly easily accomplished by a competent surgeon. The risk of the operation is not great.[16]

There is one particular lesion of stage I which must be considered separately; it is the *in situ* lesion. In 1946, Te Linde made an excellent review of data on this *in situ* lesion, or intraepithelial carcinoma as he calls it, and recommended abdominal hysterectomy without node dissection and, for patients in the younger age group, preservation of ovarian function. My colleagues and I at the clinic have arrived at a similar conclusion and advise only hysterectomy for *in situ* lesions, preferably vaginal hysterectomy. Radiation would undoubtedly result in as high a percentage of cures but we prefer surgical intervention because only by this means can we remove the whole cervix and make certain by complete histologic study that an invasive lesion is not present. Piper has made a careful follow-up study of 32 of our cases in which treatment consisted of simple hysterectomy, and we have, as yet, no reason to regret our decision. There have been no recurrences but sufficient time has not elapsed, in most instances, to make the results of this small series of statistical value.

In considering cervical epitheliomas of stage II, I am convinced by the work of Taussig, a review of the literature and our own experience that radium is more efficient in destroying the cervical carcinoma than irradiation is in destroying the regional lymph nodes. Therefore, we treat the cervical lesion of stage II with radium and six to eight weeks later carry out the Taussig operation.[17] This is a relatively simple operation which carries a low mortality rate and we believe it is well worth while. In the operation we remove the tubes and ovaries and the hypogastric, obturator, ureteral, external iliac and common iliac nodes bilaterally (Figs. 3 and 4). The aforementioned nodes are listed in order of frequency of involvement. Taussig has shown that his operation increased the five-year cures among patients who have carcinoma of stage II from 22.9 to 38.6%. All other more advanced lesions of the cervix are probably best treated by radium.

The outlook in cases of carcinoma of the uterine fundus is much more hopeful than in cases of carcinoma of the cervix; in fact, the prospect for cure of carcinoma of the uterine fundus is better than that of carcinoma of the same grade of malignancy in any other part of the body. This probably is due, in large measure, to the fact that in most cases the lesion occurs at or after the menopause when there is no doubt a definite change in the vascular and lymphatic drainage from the genital organs. The myometrium also is a barrier to extension to other organs. As a rule, carcinoma of the uterine fundus develops slowly and metastasis occurs relatively late. On this account it is not necessary or advisable to submit patients who have carcinoma of the uterine fundus to the radical surgical procedures that are indicated for cervical carcinoma. Panhysterectomy, after the cervix has been closed by suture, is the treatment of choice. We do not give preoperative radiation of any type. The diagnosis is established by immediate microscopic examination of endometrium obtained by curettage. We are of the opinion that it is important to proceed immediately with panhysterectomy. In the past we have used preoperative irradiation but have found it of little help and there are disadvantages.

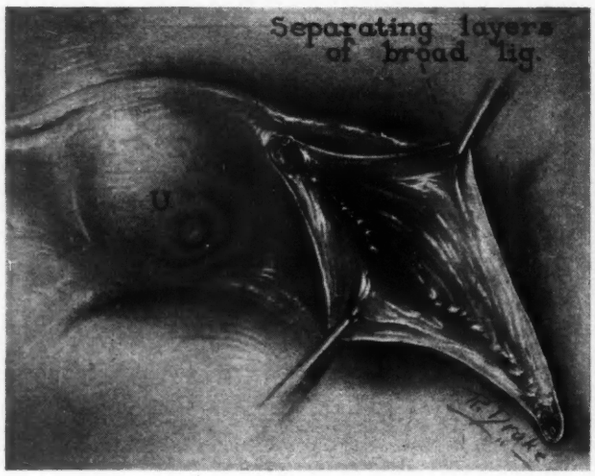



Fig. 3

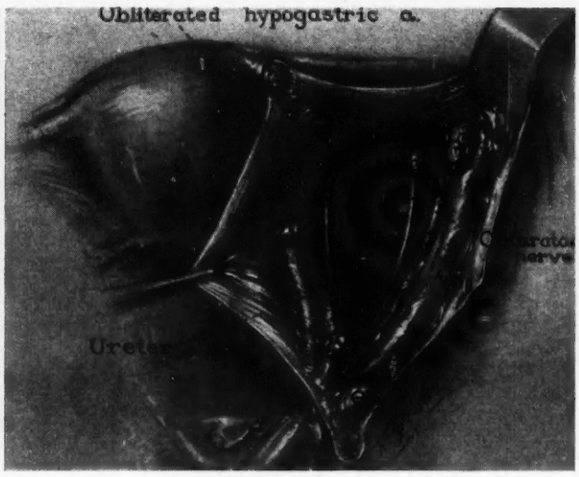



Fig. 4

**Fig. 3.**—Iliac lymphadenectomy. The tube and ovary have been removed and the broad ligament has been opened widely, exposing the structures in the iliac triangle. **Fig. 4.**—Iliac lymphadenectomy, after removal of fat, areolar tissue and all the lymph nodes described in the text. The vessels are cleanly stripped. The ureter is retracted medially with the peritoneum. The obturator nerve and obliterated hypogastric artery are seen in the depths of the operative field.

It has been our practice at the Mayo Clinic to employ postoperative irradiation when the growth is found to be of a high grade of malignancy. There are, however, two small groups of cases in which the radiologist has considerable interest: (1) cases in which extensive malignant lesions are too widespread for any curative surgical intervention but are capable of receiving much help from limited radiation therapy and (2) cases of favourable small lesions which would be excisable except for the poor general condition of the patient, who is often suffering from serious disease not related to the carcinoma.

In Table I the hospital mortality rate and five-year survival rates are given by type of lesion and type of treatment. The table is based on a study of 5,120 cases of epithelioma of the cervix and carcinoma of the endometrium which were treated at the Mayo Clinic from 1910 to 1944, inclusive. In tabulating the survival rates only cases of 1939 or earlier are included. The hospital mortality rate following all types of treatment for cervical epithelioma is within reasonable limits. It also should be noted that there is a hospital mortality rate for irradiation.

When the five-year survival rates for cervical epithelioma are compared, the 53.4% rate obtained when combined treatment is employed is impressive. This perhaps would indicate that removal of the regional nodes is an important factor. In our most recent study the five-year survival rate for cervical epithelioma treated by radical hysterectomy and irradiation was 67.1%.

TABLE I.

HOSPITAL MORTALITY RATES AND FIVE-YEAR SURVIVAL RATES BY TYPE OF LESION AND TYPE OF TREATMENT

| | *Cervical epithelioma* | | *Endometrial carcinoma* | |
|---|---|---|---|---|
| *Type of treatment* | *Hospital mortality rate, per cent* | *5-year survival rate, per cent* | *Hospital mortality rate, per cent* | *5-year survival rate, per cent* |
| Operation..... | 3.9 | 26.5 | 5.8 | 75.3 |
| Operation and irradiation... | 1.6 | 53.4 | 0.4 | 63.5 |
| Irradiation.... | 1.0 | 29.6 | 1.5 | 31.1 |
| Total..... | 1.4 | 31.8 | 3.2 | 60.6 |

In endometrial carcinoma the mortality rate following operation alone is high. However, this represents all the cases since 1910 and the mortality rate is much less today than in those early days. For instance, in the five-year period from 1920 to 1924, inclusive, it was 14.1% and for a similar period from 1940 to 1944, inclusive, it was 1.1%.

The five-year survival rate in endometrial carcinoma given in Table I might be misleading unless it is remembered that only the lesions of grades 3 and 4 received postoperative irradiation. However, a detailed study of grades of malignancy and so forth, has shown that the best results are obtained by operation and postoperative irradiation.

SUMMARY

All are agreed that early diagnosis offers the greatest hope of cure. The earliest histologic changes which justify a diagnosis of carcinoma are described.

Vaginal smear in the diagnosis of cancer of the uterus is a highly accurate test. A positive result demands that every effort be made to establish the diagnosis. Radical treatment is justified only if confirmatory evidence is obtained. A negative result of examination of a vaginal smear should never outweigh evidence in favour of malignancy.

Carcinoma of the uterus may be diagnosed earlier from the vaginal smear than by any other means.

In the treatment of uterine carcinoma at the Mayo Clinic we use surgical procedures, radium and roentgen rays, sometimes separately, sometimes combined. Results in a large series of cases in which treatment was given from 1910 through 1944, seem to indicate that a combination of operation and irradiation is the best treatment for carcinoma of the cervix or endometrium.

REFERENCES

1. U.S. Bureau of the Census: Vital Statistics of the United States, 1946, Part I, p. 105.
2. FERRIS, D. O.: *J. Internat. Coll. Surgeons*, **9**: 421, 1946.
3. MALIPHANT, R. G.: *J. Obst. & Gynæc. Brit. Emp.*, **54**: 155, 1947.
4. SCHOTTAENDER, J. AND KERMAUNER, F.: Zur Kenntnis des Uteruskarzinoms. S. Karger, Berlin, 763 pp., 1912.
5. SCHILLER, W.: *Virchow's Arch. f. path. Anat.*, **263**: 279, 1927.
6. BRODERS, A. C.: *J. A. M. A.*, **99**: 1670, 1932.
7. TE LINDE, R. W. AND GALVIN, G.: *Am. J. Obst. & Gynec.*, **48**: 774, 1944.
8. TE LINDE, R. W.: In Meigs, J. V. and Sturgis, S. H.: Progress in Gynecology, Grune & Stratton, New York, p. 349, 1946.
9. COMAN, D. R.: *Cancer Research*, **4**: 625, 1944.
10. MEIGS, J. V., GRAHAM, R. M., FREMONT-SMITH, M., KAPNICK, I. AND RAWSON, R. W.: *Surg., Gynec. & Obst.*, **77**: 449, 1943.
11. MEIGS, J. V., GRAHAM, R. M., FREMONT-SMITH, M., JANZEN, L. T. AND NELSON, C. B.: *Surg., Gynec. & Obst.*, **81**: 337, 1945.
12. MEIGS, J. V.: *J. A. M. A.*, **133**: 75, 1947.
13. HUGGINS, C., MILLER, G. M. AND JENSEN, E. V.: *Cancer Research*, **9**: 177, 1949.
14. BRODERS, A. C.: *Minnesota Med.*, **8**: 726, 1925.
15. League of Nations Health Organization, Cancer Commission, Reports Submitted by the Radiological Sub-Commission, Geneva, League of Nations Publications, pp. 82, 1929.
16. MEIGS, J. V.: *Am. J. Obst. & Gynec.*, **49**: 542, 1945.
17. TAUSSIG, F. J.: *Am. J. Obst. & Gynec.*, **45**: 733, 1943.

CHOLESTEROL PLEURAL EFFUSION.—Cholesterol pleural effusion is rather rare. Since the original description in 1882, 59 cases have been reported in the literature. In all cases the characteristic finding is the polyhedric crystals in the pleural fluid. The cholesterol content decreases with repeated aspirations. The etiology remains obscure.—Lyons, H. A.: *Dis. of Chest.*, **16**: 495, 1949.

# INTENSIVE VITAMIN TREATMENT IN SOME NEURITIDES AND SOME PSYCHOSES*

**Norman Viner, M.D.**

*Montreal, Que.*

THE material on which this report is based, is from my work in the neuropsychiatric departments, indoor and outdoor, of a few local hospitals for varying periods during the past eleven or twelve years. To these have been added cases from my private practice and particularly cases seen in outside consultation and treated by their own physicians under my guidance. Thus, the total number seen, though ill-defined, was sufficiently large.

The basis of treatment was found in the earlier reports of Spies, Jolliffe and a host of others who pointed out the effectiveness of vitamins in various neuritic syndromes as well as in some psychiatric changes, especially in relation to pellagra. Early in this period it began to be evident that there was no indication of toxicity from vitamin B elements, as these pioneers began cautiously to increase their dosage. Secondly, they began to be more doubtful of the specificity of the individual elements of the B complex. However, as a matter of caution, blood levels of these elements were taken before, during and after treatment, as well as from controls. Gradually evidence appeared that the blood level was not necessarily a true indicator and that tissue storage might be a factor as well. Furthermore, questions arose as to how these vitamins were utilized, how wasted, destroyed or excreted by the human body, without absorption, and finally whether it was not possible that the body manufactured some vitamins, and utilized others by altering them from one type that was present to another that was lacking. It was thus that concomitantly with my early therapeutic experiments about twelve years ago, I began to realize that certain of these vitamin B elements were helpful in some neurological and psychiatric conditions, that they were non-toxic and that it was uncertain as to which ingredient helped which symptoms. I therefore developed the gunshot method whereby I ultimately used the whole B complex, with frequent special emphasis on thiamin chloride and to a lesser extent on nicotinic acid as well.

What types of cases were subjected to this treatment? Since my service was neuro-psychiatric, only neurological or psychiatric problems were handled. On all the cases, a careful general and a neurological examination was made, as well as an estimate of the mental state. Let us say the presenting symptoms suggested neuritis, diffuse or local, that the history and examination did not indicate local pressure, any direct toxic, occupational, or traumatic cause of whatever type and that the complaints were obviously not neurotic. The patient was usually put on this routine, intensive treatment—occasionally with other adjuvants, none of which were of specific importance. In this series there have been innumerable cases of such plain neuritis, probably half of which have been cured or improved. In addition, there were two and only two, very well-nourished patients with avitaminosis neuritis of pregnancy, who were completely cured. There were also about fifteen cases of tic douloureux, most of them quite characteristic, of which perhaps half a dozen have been cured. It is to be noted in two or three of the latter, a second course of treatment was necessitated within a few months, and this has proved lasting. The general neuritic cases showed the usual array of pains, paræsthesias and even hypæsthesias, usually with weakness of the parts involved and frequently with diminished reflexes.

In the mental cases, there has been retardation, dulling, clouding, semi-coma, irritability, confusion, rarely euphoria, with various peculiarities of behaviour, occasionally delusions and even hallucinations. However, the general picture is more likely to be a moderate degree of confusion than a well-defined psychosis. Quite a large percentage of these patients have been elderly, with preceding indications of senility or cerebral arterio-sclerosis, so that they were considered to be undergoing a gradual decline until there had occurred a more acute deterioration of the personality demanding a psychiatric consultation. Although no pretence was made in this series of altering senility or cerebral arterio-sclerosis, it was felt that at least the unduly rapid deterioration was due to avitaminosis and treated accordingly. The percentage of improvement in this series was considerable and in some of the cases the degree of improvement was so great that it became manifest that there was no real senility, and that the previously accepted arterio-sclerosis did not exist at all or

* Read before the Canadian Neurological Society's First Annual Meeting, May 21, 1949.

was not a factor in their mental state. In fact some showed improvement not merely from their recent rapid drop, but even from their previous lengthy decline, showing that avitaminosis had been the only cause, although in the earlier stages a slow and deceptive one.

I evolved a theory in regard to the mechanism of the utilization of vitamin B in the body, that involved the assumption of tissue storage; that when the patient came to the doctor, there was a depletion of that vitamin somewhat like the depletion of fat during prolonged undernourishment; that I might try to replace that depletion in a short time, say twelve days, by heavy dosage of vitamins and prove it by a restoration of health in that period. I have succeeded in doing just that in a large percentage of cases so treated.

Of course this is a purely empirical and highly unscientific approach, but, as we know, science has often been compelled to further investigations, not to disprove the facts, but to find adequate explanations to fit them. In any case, a paper of mine on this subject before the Montreal Clinical Society about seven years ago and another at a Medico-Chirurgical meeting at the Montreal General Hospital about five years ago, elicited the criticism that I was throwing a lot of vitamins down the sink — undoubtedly in the unsuccessful cases, but at what a gain in the others.

Mentally disturbed patients arrive or occur in the various wards of a general hospital. The physicians or surgeons of those wards at once become panicky and call in the neuropsychiatrist for immediate disposal of that ward problem. As he is unable to do miracles and cure the patient at once, he is expected to dispose of the patient by sending him home or to an asylum. Over ten years ago, in the hospitals I was connected with, where I did not recognize a clear-cut psychosis from the history and behaviour of the patient, I refused to act as a rubber stamp for commitment and where there was any hint of a toxic element, I insisted that the patient be put on this intensive vitamin treatment. I can only say, that a considerable proportion of these patients were home and well in two weeks, instead of having been submitted to the popular stigma of a prolonged stay in a mental hospital.

The treatment has varied from an arbitrary period of ten days to twelve and more recently, to fourteen days. At first 1,000 milligrams of nicotinic acid was given each day by mouth or by injection for the mental types, and 50 to 100 milligrams of thiamin chloride for the neuritic types. In more recent years, the routine has been a daily injection of almost any of the various preparations of 1 c.c. of the B complex, combined in the same syringe with 1 c.c. of thiamin chloride containing one 100 milligrams. In addition the patient is daily given from six to twelve tablets of the B complex by mouth. If the results are strikingly favourable before, or by the end of treatment, it is assumed that the diagnosis has been proved and a cure accomplished. In that case, unless one can find and remove the cause of the avitaminosis, maintenance treatment, oral or parenteral, will have to be instituted—but this is a relatively simple matter.

Before presenting a few illustrative cases of the types treated, it might be wise to emphasize the theory implicit in this method—that there was a gross cumulative depletion of vitamins in this series; that this depletion could be rapidly replaced. A corollary to this would be that cases treated for many months by the usual moderate dosage of vitamins might show slow improvement, but there would be no indication to tell whether such improvement was the result of time, altered circumstances, associated medication or the vitamins. On the other hand, where the patient had been sick for many months, perhaps years and on intensive treatment showed dramatic improvement, I might even say cure, within a fortnight, not only has his misery been rapidly alleviated, but by implication, the diagnosis of avitaminosis has been established.

CASE 1

Mrs. R.O., age 78 years (care of Dr. B.K). Seen January 13, 1946. Eyesight and hearing poor for some years. Headaches for some months. Occasionally rambled. Memory good, but for past year or two disoriented for people. In past week obvious mental deterioration—mind definitely clouded. Four days ago forgetfully left some gas jets open. Next day on retiring laid herself across the bed. Became rather resistant to anything done for her, including the visits of physicians.

Examination: Incoherent, irrelevant and resistant. Routine general and neurological examination negative, except that the discs and retinæ showed some atrophy as well as an accumulation of scattered black pigment. Tongue rather red, blood pressure 150/80.

In spite of the temptation to make a flat diagnosis of cerebral arterio-sclerosis, the above treatment was instituted and in 12 days the patient was well, and better than she had been for at least a year before.

CASE 2

Mrs. J.S., age 35 years (care of Dr. D.G.). Seen March 23, 1945. An exceptionally well-nourished woman, entering eighth month of pregnancy. Numbness and pain of ulnar side of right forearm, which began as a transient numbness 3 months ago, and became more frequent, more intense and painful as time went on and finally involved whole of forearm, hand and fingers. Lately the other arm has become involved and the pain keeps her awake all night. Intensified by activity, as dressing her child or holding a book. Some weakness of arms.

A routine neurological examination was completely negative, and the patient was given an analgesic. She came back a week later even worse than before. A routine series of 12 injections was given and the patient completely cured. There was a postscript to this case. As the patient's condition was attributed to avitaminosis from pregnancy, she was given vitamins by mouth and warned to come back fortnightly for a maintenance injection during the rest of pregnancy. She did not come back until after the birth of her baby, stating that a few weeks after the cessation of the injections, the pains, numbness and weakness returned increasingly but she decided to wait for the natural cure at parturition. Within a few days of the birth, all the symptoms disappeared.

CASE 3

Mrs. R.Y., age 59 years. Seen September 13, 1946. Under care of internist for one year, who finally turned her over to neuro-psychiatrist a year ago. Latter apparently treated her for "nerves", since both physicians, who had made many tests had been unable to find any organic disease. Her complaints were lack of appetite, bad taste in mouth, weakness, paræsthesias of scalp, tingling of hands, throbbing in limbs and loss of weight. Three years ago she weighed 142 lb., today 129 lb.

Examination was completely negative except for some diminution of the reflexes. Her blood pressure was 115/75.

NOTE.—October 12, 1946: After 12 injections, tongue is better, bad taste is gone, appetite is much improved, painful throbbings and paræsthesias of scalp have disappeared, bowels are more regular, feels better, weight 133 lb. This patient has been under my care since. She takes 6 B Complex tablets a day and receives an injection once a month. By February 3, 1947, she weighed 145 lb. On one occasion, late in 1947, she did not appear for two or three months for her injections and perhaps had been lax in taking her tablets, so that there was a set-back with a drop of several pounds in weight. This was rapidly corrected with some supplementary injections of vitamins.

CASE 4

Mr. U.G., age 63 years. First seen at Montreal General Hospital Neurological Clinic, January 14, 1949. Tic douloureux mainly involving second division of the trigeminal nerve, but occasionally involving the third. Attacks came on three years ago, relatively infrequently at first, with occasional remissions of two or three weeks at a time, but with progressive increase of frequency and duration, so that now he has many attacks in a single hour. The individual spasms last from a few seconds to two minutes and include pain, heat and throbbing in the affected area. There are no trigger points, but the attack is often brought on by eating or taking a sip of water. There has been no remission for the past nine months.

By January 21, halfway through the series of injections, there was, according to the patient's statement, a diminution of the spells in frequency, severity and duration to about one-half. He finished the series with very great relief. However, on February 25, he complained of an increasing degree of recurrence in the preceding week. He was given an additional series of daily injections for 9 days, which so satisfied him, that on March 25, he stated he was practically well and intimated that he saw no further reason for continuing at the clinic.

A few comments in conclusion. A red or furred tongue, a much-fissured or painful one, cheilosis and naso-labial scaliness are helpful in making a diagnosis as to the avitaminotic causation.

In a large percentage of the failures, *i.e.*, where this method did not cure the specific complaint, there was, however, a generally improved sense of well-being brought about by this treatment.

1425 Bishop St.

## CONTACT ALLERGY TO PLASTIC ARTIFICIAL EYES*

**J. Macivor, M.D.**

*Toronto, Ont.*

IN a series of 100 patients who had suffered the loss of an eye, and were later fitted with a plastic prosthesis, 8 cases of contact allergy have appeared. In 2 of these, it was first encountered after the insertion of a partially exposed integrated plastic implant. The socket conjunctiva, in these cases, became red and œdematous within a period varying between 15 minutes and 24 hours after the insertion of a plastic eye. A discharge collected in the lower fornix, and the patient experienced a burning sensation in the socket. These signs and symptoms were relieved almost immediately by removal of the plastic eyes. The symptoms were not produced after insertion of a glass eye.

The reports of these cases are detailed below.

CASE 1

F.E.L., a 69-year old male pensioner had an enucleation of the right eye for neuropathic keratitis in 1941. At that time he was fitted with a glass artificial eye. He stated that the socket was comfortable until May, 1947. He was then fitted for the first time with a plastic eye. He stated that one hour after putting in the plastic eye the socket began to burn and considerable discharge collected. Despite numerous adjustments to this prosthesis, he discontinued wearing it due to the discomfort. He reported to the Eye Clinic in May, 1949, at which time he asked for replacement of the glass eye which was becoming worn. He was however, willing to try another plastic eye, and one was fitted. Within one hour after fitting the patient experienced considerable burning and irritation. The socket conjunctiva became reddened and œdematous in the lower fornix and a considerable mucous discharge appeared.

* From the Department of Ophthalmology, Sunnybrook Hospital, Toronto.

The eye was completely recoated with a layer of clear plastic and it was refitted on three occasions. However, the symptoms recurred whenever the eye was inserted. The plastic eye was removed and in its place, was inserted a small button of clear plastic material. The same signs and symptoms recurred. The latter test eliminated the possibility of cracks in the plastic eye and poor fitting. The patient was then fitted with a glass eye, the socket became comfortable and there was no redness or œdema of the conjunctiva. Bacteriological culture of the right socket grew a scant growth of staphylococcus albus. It was not possible to have this patient return for a patch test on the forearm.

CASE 2

A.H., a 38-year old office clerk had an enucleation of the right eye in 1945 following a gunshot wound. He was prescribed a glass artificial eye. This was described as comfortable and there was very little discharge until April, 1948. It was then found that the glass eye was cracked, and a plastic artificial eye was made. Two weeks later he returned complaining that within 24 hours after insertion of the plastic artificial eye he suffered a burning sensation in the right socket. However, despite the discomfort he wore the plastic eye for two weeks. He said he had more discharge from wearing the plastic eye for 2 weeks than from wearing the glass eye for 3 years.

A patch test with clear polymerized plastic was done on the skin beside the socket. There was no reaction after 48 hours. The same piece of clear plastic was then placed in the socket. Within 12 hours a burning sensation appeared. On removal in 48 hours there was considerable increase in the redness of the conjunctiva, œdema of the fornix had appeared and there was a moderate discharge. Patch tests were done on the forearm with the monomer form of methyl methacrylate (a water white liquid) and the polymer form, (a powder). These were negative in 48 hours. Bacteriological culture of the socket showed a scant growth of a diphtheroid bacillus and a very scant growth of staphylococcus albus. The patient was fitted with a glass eye. No further irritation occurred. The socket conjunctiva remained quiet.

CASE 3

M.E., a 57-year old pensioner had an enucleation of the left eye in 1919 as a result of a gunshot wound. He wore a glass artificial eye until February, 1948, with very little discomfort. He was then fitted with a plastic prosthesis. Within 15 minutes of its insertion he complained of a burning irritation in the socket. Examination of the socket 24 hours later showed there was increased redness and œdema and a marked mucous discharge in the lower fornix. A new plastic eye was made. However, during the course of the fitting, the conjunctiva of the left socket became so irritable and œdematous that the work had to be discontinued. He was given his glass eye to wear. Shortly afterwards the patient made another attempt to wear his plastic eye. He persisted in spite of the irritation and discharge and one month later he developed an extensive weeping, erythematous rash along the whole left side of the face extending from the left eye socket to beneath the chin. The plastic eye was removed and an anti-histamine drug was given. Within 2 weeks the inflammation and rash on the face had cleared up. At this time skin patch tests were done on the forearm with the monomer and polymer. In 48 hours these were negative. However, in 96 hours, an erythema appeared at the site of the polymer but not at the control or monomer test. Culture of the right socket showed a scant growth of a diphtheroid bacillus. A new glass eye was made and the socket became quite comfortable.

CASE 4

A.J.W., a 59-year old pensioner received a gunshot wound in the left eye in 1915, as a result of which the eye became blind. It was finally enucleated in 1947 following recurrent inflammation. He was fitted with a plastic eye in June, 1947. He was not seen again until July, 1948. At that time he complained of severe burning pain in the left socket and considerable discharge. The socket conjunctiva was reddened and œdematous and a yellowish, purulent discharge was present. Bacteriological culture showed a moderate growth of *Staph. pyogenes* and a diphtheroid bacillus. The plastic eye was removed and the socket treated with sodium sulfacetamide 30% solution. On this treatment the discharge, redness and œdema entirely disappeared. In order to preserve the shape of the socket, the patient was given a small plastic shell retainer to wear. Within 15 minutes after insertion, a severe burning pain in the socket occurred. The socket conjunctiva became reddened and a watery discharge collected. These signs disappeared on removing the retainer. Patch tests on the forearm with the polymer and monomer were negative after the end of 48 hours. However, at the end of 96 hours, erythema appeared at the site of both the polymer and monomer tests. The patient was fitted with a glass eye. No further irritation or discomfort occurred.

CASE 5

R.W., a 52-year old veteran had an enucleation of the left eye in 1916 following a gunshot wound. He wore a glass eye without any notable discomfort until 1947. He was then fitted with a plastic eye. He stated that within 24 hours after insertion of this eye, a burning sensation occurred and he was forced to remove the prosthesis. This trouble recurred whenever he attempted to wear the plastic eye, and he then went back to wearing his glass eye. In May, 1949, he was fitted with a second plastic eye. Once again a severe burning irritation occurred within 24 hours after insertion. Redness and œdema of the socket conjunctiva and a watery discharge appeared. Patch tests on the forearm with the monomer and polymer were negative. A small button of clear plastic was inserted in the socket. Within 48 hours the patient suffered a moderately severe itching.

There was, however, no œdema or increased redness or discharge. Bacteriological culture showed a scant growth of *Staph. pyogenes* and *Strep. viridans.* The patient was fitted with a glass eye and the socket became asymptomatic.

CASE 6

W.E.F., a 48-year old elevator operator had enucleation of the left eye in 1944 following a gunshot wound. He wore a glass eye until July, 1948. At that time he was fitted with a plastic eye. Almost immediately after insertion a burning sensation appeared in the socket and within 24 hours there was increased redness and œdema of the conjunctiva. The symptoms were relieved by removing the plastic eye. Patch tests with monomer and polymer were negative. However, a clear button of plastic placed in the socket duplicated these symptoms. Bacteriological culture showed no growth. The symptoms disappeared when the patient was fitted with a glass eye.

CASE 7

C.A.C., a 24-year old veteran suffered a gunshot wound in the right eye in August, 1944. The eye was enucleated in September, 1947 for recurrent inflammation. A plastic ball and ring partially-exposed implant was inserted. From that time until May, 1949, when the implant was removed, the patient suffered intractable, profuse discharge from the socket. The conjunctiva remained beefy red, heaped-up and œdematous despite all treatment. In May, 1949, a heavy growth of *Bacillus pyocyaneus* was found. The patient was treated with aureomycin topically. The cultures became negative However, the œdema and redness and watery discharge remained unchanged. Within one month after removal of the implant, the conjunctiva was well healed, the conjunctival redness had entirely disappeared and there was no œdema and only slight discharge. Before the implant was removed, scrapings from the lower fornix were taken and no eosinophiles were found but there were many polymorphonuclear leucocytes present.

CASE 8

N.R., this 22-year old female suffered a retinal detachment in the right eye in 1947. There was no treatment given and she became completely blind in that eye. In December, 1948, an absolute glaucoma developed and enucleation was done. A Cutler type integrated plastic type implant was inserted. Following insertion of the implant the conjunctiva of the socket remained constantly red and œdematous and there was a marked purulent discharge which did not respond to treatment. It was felt by her physician that she had developed sensitivity to plastic and on that account the orbital implant was removed. Following removal the redness of the conjunctiva receded markedly and the œdema disappeared.

In all cases detailed above, a burning sensation occurred in the socket within 15 minutes to 24 hours after insertion of the plastic eye. Within 24 hours the socket conjunctiva had become reddened and œdematous and a discharge had collected. The signs and symptoms were relieved on removal of the plastic artificial eye. When a glass eye was inserted the symptoms were not reproduced. In these orbits infection was readily controlled with antibiotics and was not a factor in the continuing discharge and irritation.

Patch tests on the forearm were done with the powdered polymer and liquid monomer of methyl methacrylate. In case 3 the test for polymer was positive at the end of 96 hours and in case 4 the test was positive for both polymer and monomer. In the remainder of the cases the skin patch tests were negative. In all cases the insertion of a small button of clear plastic in the socket produced a typical allergic response. This test is felt to be the equivalent of a patch test in the mucous membrane.

All of the plastic eyes were carefully examined with the slit lamp for roughness or cracks and in no case were these found to be factors. In each case the plastic eyes were recoated with clear methyl methacrylate and recured. There was no change in the reaction produced in the socket. In all cases the insertion of a glass eye relieved the symptoms and there was no recurrence.

A review of the literature discloses that very little has been written on this subject. The occurrence of contact dermatitis in dental technicians working with methyl methacrylate has been reported.[1] It was felt that in these cases the dermatitis was due to the liquid monomer. Cases of sensitivity to methyl methacrylate in dental prostheses also have been encountered.[2] In the earlier reports on integrated plastic implants the development of sensitivity to the implant was found in a number of cases.[5]

The method of manufacture of plastic eyes at Sunnybrook Hospital has been standardized to the following procedure. Materials used are: Vitracylic,* a proprietary preparation of methyl methacrylate which comes in the form of a liquid monomer and powdered polymer; cellulose nitrate, oil paints, titanium oxide and red nylon thread.

The colour of the iris is painted with oil paints on a small button of cellulose nitrate. The methyl methacrylate monomer and polymer are then mixed in the proportion of 3:1. The cellulose nitrate button is surrounded by this mixture in a mould, and this portion of the eye is brought to a temperature of 167° F. over a period of one-half hour. It is held at that temperature for one-half to three-quarters of an hour. Then, using the same ratio of powder to liquid, plus a small amount of titanium oxide for colouring, the plastic eye is formed about the iris button in the mould. At this stage it is cured for one to one and a half hours. At the completion of the curing the blood vessels, which are made with red nylon thread, are cemented to the sclera with fully cured plastic. The eye is then covered with a thin layer of clear plastic and cured for a minimum of three to four hours, the usual length of time being eight hours. This produces the final eye. It has been found that this method of curing results in 96% polymerization of the plastic. The remaining free monomer in the polymer is very tightly bound and is not released even upon long time heating at high degree. Nor is it possible to wash out any of this free monomer from the polymer by immersion in water for long periods.[4]

The patch tests performed in the eye sockets with clear polymerized methacrylate are considered to be more reliable evidence of contact allergy than patch test performed on the skin of the forearm. The reaction is localized to the conjunctiva in the socket. It is very important in these cases to rule out acute or chronic conjunctival infection and defects in the prosthesis itself, *e.g.*, roughness, cracks and poor fitting.

## SUMMARY

Eight cases of sensitivity to plastic are reported, 6 of these from plastic artificial eyes and 2 from partially-exposed plastic implants. In 2 cases plastic patch tests on the skin of the forearm were positive and in all cases patch tests in the socket were positive. Six cases were cured by insertion of a glass eye and 2 by removal of the plastic implant.

The author is indebted to Dr. W. R. F. Luke for permission to include the last case in this series. Acknowledgment is made of consultative assistance from Dr. N. W. Wrong and Dr. A. L. Hudson of the Dermatology Clinic, Sunnybrook Hospital.

REFERENCES

1. SCHWARTZ, L., TULIPAN, L. AND PECK, S. M.: Occupational Diseases of the Skin, Lea & Febiger, 2nd ed., p. 476, 1947.
2. SULZBERGER, L. B., *loc. cit.*, LOCKEY, S. D.: *J. Allergy*, 15: 188, 1944.
3. RUEDEMANN, A. D., *loc. cit.*, DURHAM, D. G.: *Am. J. Ophth.*, 32: 79, 1949.
4. NELSON, C. A., Research Director: L. D. Caulk & Co., Milford, Delaware. Personal communication.

* Frick Dental Manufacturing Co., Chicago, Ill.

# HEARING DEFECTS IN CHILDREN*

**Lavell H. Leeson, M.D.**

*Vancouver, B.C.*

THIS subject is one which is occupying the attention of otologists in Canada, and the world at large, with an ever-increasing interest. In each locality some work is being done to bring a better hearing to deafened and partly deafened children, but the necessary research into the underlying causative factors of deafness is still in the initial phase.

The largest Canadian research project into the hearing defects and diseases of the ear in children will be established in the Otolaryngological Department of the University of Toronto, with funds provided by the Atkinson Charitable Foundation. It will be under the direction of Dr. D. E. S. Wishart. This Department, with special reference to the research, the examination and diagnosis of defective hearing in children, will be established in the new Hospital for Sick Children, which is at present under construction.

The aims of this clinic are: (1) To establish a method by which children with hearing defects may be examined and classified for educational purposes. (2) To demonstrate to trained observers of the Board of Education, the latest and best method of screening out pupils with ear defects. (3) To conduct research into diseases of the ear in children with the objective of arresting hearing retrogression at an early age. (4) To guide parents, school observers and others interested in the selection and application of proper hearing aids. (5) To investigate and to demonstrate for the benefit of the medical profession, the most recent and best methods of diagnosing and treating ear defects in children.

There will be children born deaf, and there will be others who become deaf between birth and two years of age. These will not be able to learn language and will have difficulty in learning to speak.[1] Heredity is responsible for only 25% of those children born deaf. Responsible factors in deafness of the other 75% may be rubella in the pregnant mother, injuries at birth, quinine, childhood fevers, not particularly as catarrhal, but as the toxic disturbances of the nerve and cochlea. Measles is probably the most common foe. Meningitis and encephalitis sometimes serve to produce deafness. Purulent otitis media may destroy hearing as a complication of the common cold, as well as of the exanthems.[2]

At the time the child is brought to the otologist, the parents have been worried because speech has been delayed in the infant. They may also have noticed that the child is unable to hear. It should never be the attitude of the doctor to dismiss the patient and label it as one who is deaf. With means now at hand, any residual hearing can be amplified by instruments. It is the attention to sound which awakens hearing in the partially deafened child.

When a period in training has been reached, at which point the child is able to concentrate and listen an audiometer can be used to give more information as to the amount of residual hearing. If this hearing is found to be in the speech-hearing zone, a hearing aid can be fitted and worn, after the child has been trained to wear the apparatus. With a hearing aid the training is continued, at first not allowing lip-reading. After speech form and tone have been formed, lip-reading is allowed to improve speech and facilitate conversation.

Concurrent complications, such as the common cold, the presence of adenoid vegetations, and Eustachitis, must be controlled so that they do not add a further burden on the already present deafness.

The more serious problem and the one which is brought more frequently to our attention, is the deafness in children over two years of age, and particularly in the school-age child. Specific otological diseases, such as acoustic neuritis, otitis media, tuberculosis, syphilis, otosclerosis, have been the basis of study by otologists for years. As research continues, it is hoped more can be done for children who have suffered as the result of deafness caused by these diseases. Efforts toward prevention of deafness in children, the early discovery of the condition, the treatment insofar as possible, and the adjustment of the child to environment and education, are our objects.

When the parents have noticed a continuing deafness in the child and have taken it to a physician to ascertain the cause, the remedial

* Read at the Eightieth Annual Meeting of the Canadian Medical Association, Section of Otolaryngology, Saskatoon, June 16, 1949.

measures common to most of us are instituted. The tonsils and adenoids, if infected and enlarged, are usually removed. In too many instances this is all that is done by the doctor. Too frequently the necessary after-treatment is disregarded. Remember, one of the importants parts of the treatment is to assure oneself that the Eustachian orifices are uncovered, and that the tubes are patent. How rarely is one satisfied that the tubes are inflated, even after a mild attack of Eustachitis? Tubal catarrh is a damaging disease in the results of hearing.

Another type of treatment which has its votaries and has been used extensively is the application of radium to the adenoid vegetations in the region of the Eustachian orifices.

When the child reaches the elementary school, group-testing of classes is done in the larger centres. Those children with a loss of twenty decibels or more are referred by the school nurse, usually to the family doctor, for attention. He does the best he can within his limitations. It is gratifying to note that the family physicians and pædiatricians are referring these hard-of-hearing patients to the otologists in ever-increasing numbers. But even we are not taking advantage of all adjuvants at our disposal. Audiometric readings are not made as frequently as they should be done. I believe that it is necessary to have an audiogram made before and after any treatment in which the deafness is more than that found in an acute tubal catarrh.

In any training program of the deafened child, the objective is to teach language and to develop speech by the normal hearing method. Only with the hearing of speech is proper imitation of speech possible. The deafened child with a hearing aid that reaches his audition, can hear his own voice and can avoid the flat, unintelligible speech of the deaf.

Today's accepted method is to keep this child in the realm of home normalcy, to the avoidance of institutionalizing him if possible. Children in this group, trained as such, are for the most part getting languages rapidly and many are ready by the sixth year to enter school along with children of normal hearing. Parent training plays a great part in such a program. The unique school of Mrs. Spencer Tracy in Los Angles during the past six years has shown the necessity and advantages of parent-child training.

The Tracy clinic provides four kinds of instruction: classes in child development, speech training, and parents' attitude; a nursery school which mother and child enter as a unit; a six-weeks' summer session for parents and children; and a correspondence course which has been taken by more than two thousand parents in eighteen different countries. The results have been spectacular.

The 1948 Annual Report of the National Society of the Deaf and the Hard of Hearing, brings to notice the methods being adopted in Canada. The report of Dr. Fee,[3] the Medical Director, based on the patients attending the clinics in Ontario, is enlightening. It shows that progress has been made in the larger centres in Ontario in the establishment of clinics for the diagnosis and treatment of the hard of hearing patient. This progress, though slow at the beginning, is now gathering momentum and it is hoped that similar clinics will soon be established in all large Canadian centres.

The Child Health Centre in Vancouver has recently sent a questionnaire to all doctors, Provincial Public Health officers and nurses, in British Columbia. This questionnaire covers all diseases encountered by children in the several communities, and includes the question as to whether the child reported on has suffered any defective hearing. This survey should provide valuable statistics on the number of hard-of-hearing children reported in British Columbia. Perhaps we in Vancouver are making a small beginning even though we are still without the benefit of a medical school.

We live in an age and a country where enthusiasm for the future, and work for the present are companions. With these two attributes at hand, and with the knowledge and facilities to diagnose, treat medically, surgically and with appliances such as hearing aids, it is hoped that more deafened children can be salvaged from that large group of unfortunates who have unserviceable hearing.

It would seem to be our duty as otologists to embark on an early program in our local communities. The interested parties in the deafened child, as the parents, pædiatrician or family doctor, the school nurse, and ourselves, should realize the present inadequacy of our handling of these little people. We, as the group entrusted with this problem, should re-

quire our school authorities, local provincial and Dominion governing bodies; to provide adequate clinics for the reception and treatment of the deafened child, and monies to further the work so ably started by doctors in the larger medical centres.[4]

It is the opinion of all otologists that the care of the deafened must be commenced early in life. It is also recognized that the doctors are anxious and willing to carry out the treatment and re-establishment of those who have serviceable hearing, but it is recognized that before any work can be done on a provincial or Dominion-wide scale, the Departments of Health and Education must provide buildings, equipment and lay teachers, to re-habilitate those deafened children who require speech training, voice correction and re-habilitation in their lives. We know little has been done on any concerted large scale. It would therefore seem necessary that we, from the several provinces of this Dominion, should return buoyant in the hope that work would commence as soon as possible on a program for the diagnosis, treatment and education of the hard of hearing child. This was stressed by the President of the Canadian Otolaryngological Society in his address before that organization.

SUMMARY

There are children born deaf and there are others who become deaf between birth and two years of age. Ordinarily, these will not be able to learn to speak.

Heredity is responsible for only 25% of deafness in children. Early diseases of childhood cause 75%.

Early training of the hard of hearing child is necessary.

Surgical removal of infected and hypertrophied tonsils and adenoids, the patency of the Eustachian tube, is one of the first surgical procedures in treatment.

Radium applicators in the fossa of Rosenmueller may be necessary.

Children in elementary schools are group-tested and if found with a hearing loss of more than twenty decibels, are referred for further attention. The audiometer is being used more and more with greater satisfaction to the otologist.

Institutionalizing of children should be avoided if possible.

School authorities and local provincial and Dominion governing bodies will find it necessary to take greater interest and provide more facilities for the examination and training of the hard-of-hearing child.

REFERENCES

1. FISHER, G. E.: *Eye, Ear, Nose & Throat Monthly*, 5: 222, 1949.
2. MACFARLAN, D.: *J. A. M. A.*, 137: 774, 1948.
3. FEE, G. A.: *Nat. Soc. Deaf.*, 1948.
4. NEWHART, H.: *Trans. Oph. & Oto.*, March, 1943.

925 W. Georgia St.

## THE PNEUMOKONIOSES: DEVELOPMENTS, DOUBTS, DIFFICULTIES*

**E. R. A. Merewether**

*H. M. Senior Medical Inspector of Factories, Great Britain, London, Eng.*

PREVIOUSLY in the history of the pneumokonioses there have been times when the path of progress has disappeared in a forest of data and the traveller was beset with doubts. It seems that we have reached just such a point now, when we must stop and take our bearings. Firstly, what really is the present position? In England we have some 800 deaths a year from pneumokoniosis and there are over 16,000 cases registered as "disabled persons". These numbers may not appear striking compared with the 4,000 deaths a year of adults from road accidents and the 20,000 deaths from respiratory tuberculosis. But, when we stop to try to estimate the relative risks of death from these causes in relation to the numbers of people exposed to them, then the risk from pneumokoniosis appears fantastically high. On this basis, the figure of 800 deaths a year from pneumokoniosis would have to be multiplied by an unknown but large factor to view this risk in correct perspective. It can be said with certainty, however, that a few months' exposure to silica or asbestos dust in gross or, to use Leroy Gardner's happy word, "insulting" concentrations will inevitably cause death. However, when we go further and think, not of one small country, but of the world and consider the toll of life throughout the ages from these diseases from all the mining, quarrying, fabricating and construction work carried out, we may well

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, Section on Industrial Medicine, Saskatoon, June 15, 1949.

regard them as one of the major scourges of humanity.

Again, when we think of the achievements of medicine in preventing and curing diseases like diphtheria, we cannot help but ask, with something of shame, why the mortality from these dust diseases remains so high, seeing that in theory at any rate, they are wholly preventable. It must be confessed that understanding of the problem and of its urgency, by the professions, managements, workers, and the public generally, is inadequate and ill-diffused and we cannot hope for real advances until this is rectified. This comes about because the pneumokonioses have no spectacular impact on the community, like accidents or dramatic epidemic diseases which make news headlines: silently and insidiously they creep, like old age, upon their victims distributed over many industries, who fade away with little but local disturbances. They are difficult to diagnose and often masquerade as other diseases. The medical teaching schools and textbooks pay little attention to them and nothing to the industrial processes which cause them—without a knowledge of which, diagnosis is but guess work, and also, the terminology used is vague and confusing. What is needed is national and international team-work like that applied to the study of atomic energy and then a very large measure of control of these diseases would be assured. The first steps are to agree, internationally, on a standard terminology, standard criteria of diagnosis, standard x-ray technique, and standard type films, minimum standards of preventive measures, of compensation and rehabilitation procedures, strictly enforced by law: priorities of aspects for immediate research on the medical, engineering and other scientific aspects and, above all, we need intensive national programs of education with the aid of the popular, professional, scientific, and trade papers. Instruction should be made compulsory in relevant degree and diploma courses, in technical institutes and trade schools, and for workers, managerial, and supervisory staffs engaged in work which involve risk of these diseases.

Let us look, very briefly, at some of these points. Consider first the confusing terminology used with these diseases. So far, I have had to use the words "these diseases" with the equally vague alternative "pneumokoniosis" in this discussion, for this very reason. Pneumokoniosis means "dust and the lungs" a vague generality which indicates no particular entity and implies no pathology and no disability. To medical men it means, without further definition, merely "any respiratory condition which may be ascribed to dust". Thus, it may include anything from an abnormal x-ray picture as seen in welders, or silver finishers, or iron-oxide workers, due to diffraction of the rays by minute particles of metal dust which causes no symptoms, no disease, and no disability, to gross fibrosis of the lungs with extreme shortness of breath, compensatory emphysema, pneumothorax, bronchiectasis, and gross pleural, pericardial, and diaphragmatic adhesions, as in advanced asbestosis. It may include cancer of the lung due to radioactive dusts, beryllium granulomatosis, and all the curious affections associated with workers handling grain, bagasse, mouldy cotton and hay. Clearly an expression which implies both trivialities and most serious diseases is of no practical use and is liable to mislead. Again, consider the expression "siderosis". It was coined first I think, as a respectable name for "grinders' rot"—which, at least, told us something—to describe an interstitial fibrosis of the lungs then thought to be caused by fine metal particles: a quarter of a century later, some people used it as a name for silicosis in hæmatite miners, and now, after another quarter of a century it is used to describe both the killing fibrosis of hæmatite miners and the harmless spotting of the lungs by fine metal particles, discernible only by radiography.

Then if, in desperation, we turn to the dictionaries, what do we find? Taking one at random, after stating the derivation of pneumokoniosis to be from the Greek, meaning lung plus dust, it goes on: "A lung condition due to the inhalation of minute particles. It is attended by fibroid induration and pigmentation. See aluminosis, anthracosis, asbestosis, byssinosis, chalicosis, ptilosis, siderosis, silicosis, and tabacosis." As you will observe, some of these expressions are merely alternative appellations, some may not exist and a number are not necessarily attended by, and are certainly not associated with, fibroid induration of the lungs. But, let us not give up: on turning to "ptilosis" we are told it is "a form of pneumokoniosis caused by inhaling the

dust from ostrich feathers''. What this definition really means only the bird knows. I will not weary you further except to remind you that compound names are used, as for instance, silico-anthracosis and I have seen several cases with both silicosis and asbestosis to which, fortunately, as yet no special name has been applied. This is confusion worse confounded: no wonder we mislead and are misled and when the experts collide in the fog, the courts of law flee to the dictionaries, and what a paradise for our friends the lawyers. We simple minded and, of necessity, practically disposed persons, must really avoid being hypnotised by the theoreticians and shackled by the lexicographers, and tidy up this nomenclature. It might profitably be discussed and agreed internationally, as has already been done in defining the meaning of the term ''silicosis''.

In some countries, the law has had to step in for its own urgent purposes and tell us what we mean; for industrial health is dependent not only on doctors and nurses but also on engineers, chemists, physicists, and so on and is primarily a responsibility of governments and of industrial managements, and so everyone concerned must understand exactly what is meant and required. Thus, in our own National Insurance (Industrial Injuries) Act, we find that ''the expression 'pneumokoniosis' means fibrosis of the lungs due to silica dust, asbestos dust, or other dust, and includes the condition of the lungs known as dust reticulation''. This has its pitfalls especially in the use of the word ''dust reticulation'', and its limitations, in that it does not include such conditions as ''byssinosis'' (which is dealt with separately); but in spite of this it includes the great majority of related killing and disabling forms of pneumokoniosis, and thus is a practical step forward.

Now a word or two on diagnosis: diagnosis is difficult, which is one reason why both here and in England special boards have been constituted to determine finally diagnosis and degree of disability. In every suspected case, for accurate diagnosis we need to know all about the dust or dusts concerned and the length of exposure to them, the complete occupational history from first starting any work, the clinical history and findings, and the radiological appearances, and inadequate information on and faulty interpretation of any of these aspects can wholly wreck the diagnosis and cause much hardship and injustice. We need, therefore, medical, scientific, and industrial knowledge and so—team work of the best class.

You will note that the points I have mentioned—causative dusts and processes, clinical findings and x-ray appearances—as the basis of diagnosis, are also the basis for progress. Without accurate diagnosis the harmfulness of a dust and the hazard of a particular process cannot be assessed, and without these, appropriate preventive measures cannot be devised. I cannot stress too much the importance of accurate diagnosis and this, it is vital to remember, involves non-medical as well as medical considerations. This leads to the further point that while a certain amount of mysticism is not alien to the art and science of medicine, the age of witchcraft in the practice of industrial health is long since past. Apart from the fact that the patient needs a reasoned prognosis which necessarily is based on accurate diagnosis, managements cannot cope with the responsibilities laid upon them by law without skilled medical aid, and consequently may be quite knowledgeable in these matters.

Now what do we know of the relative harmfulness of dusts? Regrettably, not nearly enough. Nevertheless, we can make some useful generalizations. The first is, that all dusts whatever their composition will cause functional damage, but only some kinds have been proved to be capable of causing fibrosis of the lungs, that is, true pneumokoniosis. The latter are those dusts containing silica in the free state as $SIO_2$ and also out of the multitude of other mineral dusts, only the small class of fibrous silicates known as asbestos. These in their pure forms, for example as quartz or asbestos, unmixed with other dust, and in the absence of infections particularly tuberculosis, give rise to the classical forms of silicosis, a nodular fibrosis, and of an asbestosis, a cobweb fibrosis, which are closely reflected in the typical x-ray pictures.

Therefore, classical silicosis and classical asbestosis are relatively easy to diagnose, but so often we find these classical types modified by the action or mere presence of other relatively inert dusts, to which the patient has been exposed at some time or another. Infections and some of these other dusts accelerate the development of fibrosis and others are thought to inhibit it, but all tend to modify, often profoundly,

the pathology and radiographical appearance of the classical types. This is where we may run into great difficulties in diagnosis and prognosis and in the advice we give to managements. Excluding terminal broncho-pneumonias, tuberculosis is the most frequent infection. In a series of over 2,000 deaths from silicosis and a series of 232 deaths from asbestosis investigated by my department, 50 and 31% respectively were complicated by tuberculosis. This susceptibility to tuberculosis is covered by our law, which compensates the sufferer from silicosis or asbestosis whether or not the disease is accompanied by tuberculosis.

Exposure to other dusts such as in nickel refining by the Mond process (which also causes cancer of the ethmoid), in the manufacture of chromates and bichromates, and arsenic, is associated with an increased incidence of cancer of the lung, but none of these dusts also causes a true pneumokoniosis. A point of considerable interest which comes to light from our records is the possible association of asbestosis and cancer of the lungs. In the same series, 13.2% of cases of asbestosis were found on autopsy to have cancer of the lungs. This is in contrast to silicosis in which our figure is 1.32%. Little is really known of the mode of action of silica and asbestos dust and the wherefore of these variations, but they emphasize the need for most accurate data on the human cases which occur. There are obvious reservations to the direct application of animal work to humans. Scientists have propounded both mechanical and chemical theories in explanation, but as E. J. King has shown by laboratory experiment the different rates of solubility of silica from different dusts do not parallel their fibrosis producing powers. Similarly Leroy Gardner's mechanical theory as to the mode of action of asbestos dust does not wholly explain the production of asbestosis. Again, Andrew Meiklejohn and W. W. Jones, in a follow-up of pottery workers, exposed to alumina dust have been unable to find any slowing up of the disease in cases of silicosis, in spite of the promise of the laboratory experiments on the inhibition of the solution of silica by alumina. It does not follow that these theories should be discarded, but rather that other factors, including them, play a part and, maybe, in respect of the added susceptibility to tuberculosis particularly, the production of an imbalance of the intracellular enzyme system is one. Most enigmatic of all is the disease described by Shaver and Riddell, and also the mode of production of the fibrosis associated with exposure to beryllium, both of which pose questions as to the rôle of fumes in the production of pneumokoniosis.

However, as all this may be, we must, like St. Paul, throw out a few anchors in the storm and, from the practical point of view, free silica and asbestos are the inherently hazardous dusts which must be dealt with, whether encountered singly or mixed with other dusts. Although so-called individual "susceptibility", that is, the particular state of the individual's lungs plays a definite part, naturally, the greater the amount of silica or asbestos inhaled, the greater the damage to the lungs. But, an important point is that they may be present in quite low proportions in a mixture of dusts and yet cause much damage. Thus I have seen death from silicosis from exposure to an inert dust containing only 10% of added free silica and some samples of French chalk containing less than 10% of free silica and some asbestos, can cause both silicosis and asbestosis at the same time, although the pure material is inert. The reason for this is not difficult to see. A certain amount of silica or asbestos must be retained in the lungs to cause disabling disease, and the effect of overloading the lungs at the same time with large amounts of inert dust is to disorganize the normal lymphatic drainage, and so ensure the retention of the dangerous dust.

This may well be the mode of production of the coal miner's lung, the result of exposure to massive concentrations of coal dust containing very little free silica. With exposure to concentrations of dust of this order, local blockage of lymphatics caused by overloading with dust, or by infections, will prevent the clearing of adjacent choked lobules and give time for the silica, a tissue poison, to act. Thus, we get a condition of focal atelectasis with focal fibrosis and compensatory focal emphysema throughout the lungs, as is beautifully shown by Gough of Cardiff University in his whole lung sections, and this is a clearly progressive condition with continued heavy exposure.

So far I have touched generally on the problems of the true pneumokonioses, dusts in their etiological aspects and the pathological features

of these diseases, and have stressed the vital importance to progress of pooling the skill of medical men, scientists, engineers, and managements. I have referred to the many variations from the classical types of these diseases and the consequential difficulties in diagnosis and prognosis and in assessment of the hazard of the causative work. I have indicated that the doctor's approach to problems in this field is three-pointed by way of occupational history, clinical findings, and radiographical appearances. Now, a few words on the third point—the radiographical appearances. This is just as much a headache as the other two, but is vitally important and may be conclusive. The pathological basis of the disease, that is the fibrosis, is of course reflected in the x-ray picture, but the classical appearances are more often than not modified by coincident tuberculosis, or by other disease, or obscured by the highly diffracting effect of retained inert dust. Moreover, different radiographical techniques and different types of films can mislead completely. Pending internationally agreed techniques and type films which are long overdue, the only practical suggestion is to collect your own library of type films from cases whose complete occupational and clinical histories with autopsy findings are available. This can best be achieved by local medical societies.

In discussing this tremendous national problem of the control of pneumokoniosis, I may have given a pessimistic outlook in saying too much about the difficulties of the position, but history teaches us that always just prior to great advances in knowledge and its application, we have wallowed in just such confusion. Can we hope for a dramatic discovery to guide us, such as that of the bacillus of tuberculosis which ended one long period of confusion as to the nature of these diseases, or that of the roentgen rays which pointed so imperiously the route to better diagnosis? Is it too much to hope that lines of research at present being pursued will lead to a discovery of equal magnitude on the preventive side, such as a perfect inhibitor or an instantaneous continuously recording dust counter, or, dream of dreams, a dust arrester which could be worn on the chest or like a miner's head lamp or both, and prevent dust reaching the mouth and nose and yet leave the face completely free from encumbrance? I hope so.

## INFECTIOUS MONONUCLEOSIS

**B. F. Paige, M.B., B.S. (Sydney)***

*Vancouver, B.C.*

AN analysis of the last 45 cases of mononucleosis seen on the medical service of the Vancouver General Hospital has convinced us that it is timely to take stock of present knowledge of the condition.

Infectious mononucleosis is a self-limited disease occurring in young people and characterized by fever, sore throat, a swelling of the cervical lymph nodes and frequently of other lymph nodes, an increase in the mononuclear leukocytes and a granulopænia, and a positive Paul Bunnell test. Of these symptoms and findings three are of chief diagnostic importance: (1) Cervical lymphadenopathy. (2) Increase in the mononuclear leukocytes. (3) A positive Paul Bunnell test.

Unless a patient exhibits at least two of these three findings, it is difficult to see how the diagnosis can be more than pure speculation. All the cases in our series have at least two of three criteria, and most of them have all three. An analysis is as follows:

Total cases, 45.
Cases with cervical lymphadenopathy, 36.
Cases with marked increase in mononuclear leucocytes, 44.
Cases with positive Paul Bunnell test, 36.
Of the 9 cases in which cervical adenopathy was not recorded, 5 had a marked tonsillitis.

The one case which did not have a marked increase in the mononuclear leukocytes had 33% mononuclear forms in a total of 4,650, with 35% of polymorphonuclears and 28% staff cells. This patient had enlarged cervical glands, and the Paul Bunnell test was positive in dilution 1:320. He, therefore, showed the main features of the disease.

Before proceeding with an analysis of the cases it is appropriate to discuss the Paul Bunnell test or heterophile agglutination. The serum of normal subjects contains an agglutinin (Forssman) for sheep's red blood cells which does not exceed a titre of 1:8. In most cases of infectious mononucleosis, after 7 to 10 days, the serum shows an increase in this sheep's red cell agglutinin and the titre may rise to very high figures (in this series to 1:10240). Several examinations at intervals of a few days may be necessary to determine whether the result is positive. It is generally agreed that a rise to 1:32 or more is definitely abnormal. A rise in titre has been observed in individuals who have recently received injections of horse serum, but it is rare in other conditions apart from infectious mononucleosis. It is

* Resident, Department of Medicine, The Vancouver General Hospital, 1948-49.

now believed that this agglutinin is not, as originally supposed, the heterophile agglutinin of Forssman.[1]

Three different anti-sheep red cell agglutinins can be distinguished in human serum by appropriate absorption tests (Davidsohn). (1) The Forssman type, that commonly found in normal serum, is absorbed by guinea pig kidney, but not be autoclaved ox cells. (2) The type occurring in infectious mononucleosis is obsorbed by ox cells but not by guinea pig kidney. (3) The type appearing after injections of horse serum is absorbed by both.

In questionable cases the dependability of the test is increased by demonstrating that the agglutinin is absorbed as indicated in (2).

This illustrates how false positives may be eliminated and how the heterophile agglutination test can be of great value in the diagnosis of infectious mononucleosis, particularly with the aid of the Davidsohn absorption tests.

These absorption tests were not used in the present series, but in none of our cases was there any history of recent injections of horse serum. The test was regarded as positive when there was agglutination at a dilution of 1:32 or more.

As in other series, we have noticed the large number of nurses and interns in our group of cases. It seems most likely that this high incidence amongst hospital staff is due to the more accurate diagnosis of the condition in these people.

One cannot stress too much the fact that infectious mononucleosis has an important place in the differential diagnosis of tonsillitis and pharyngitis: 41 out of 45 cases (or 91%) had a sore throat. Actual ulceration of the pharynx was found in 4 patients and membrane formation on the tonsils in 11 more. The presence of the membrane naturally can lead to confusion with diphtheria, while the ulceration with marked granulopenia is suggestive of agranulocytic angina or leukæmia.

Of the 45 cases in the present series, 33 followed what we would describe as the typical pattern of the disease, while the remaining 12 were atypical. The 33 typical cases (Table I) all showed marked enlargement of the cervical lymph nodes, pharyngitis, or both, had a marked increase in mononuclear white cells of the blood, and in 76% of cases had a positive heterophile agglutination test. They all suffered from fever and malaise: 5 (or 15%) of the group had a palpable spleen: none of them had any physical or laboratory findings which would be considered unusual in this disease. The remaining 12 patients (Table II) all showed a deviation from this pattern in some important respect.

TABLE I.

TYPICAL CASES OF INFECTIOUS MONONUCLEOSIS (33)

| *Serial No.* | *Initials* | *Age* | *Sex* | *Throat involved* | *Glands* | *White cell count* | | | | | *Heterophile agglutination* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *Total* | *P.* | *L.* | *M.* | *Others* | |
| 1 | H.S. | 24 | F. | Yes | + | 10,750 | 11 | 60 | 1 | 28 | Pos. 1:64 |
| 2 | M.A. | 20 | F. | Yes | — | 13,250 | 10 | 70 | | 24 | —— |
| 3 | E.H. | 21 | F. | Yes | + | 11,000 | 7 | 74 | | 19 | —— |
| 4 | S.P. | 6 | F. | Yes | + | 13,200 | 20 | 60 | | 20 | Pos. 1:128 |
| 5 | N.M. | 37 | F. | Yes | — | 8,550 | 18 | 64 | 6 | 12 | Pos. 1:64 |
| 6 | C.S. | 19 | F. | Yes | — | 9,200 | 15 | 76 | 3 | 30 | Pos. 1:64 |
| 7 | A.H. | 25 | F. | Yes | + | 10,000 | 13 | 65 | 2 | 20 | Pos. 1:16 |
| 8 | M.J. | 22 | F. | Yes | + | 18,200 | 27 | 48 | 18 | 7 | Pos. 1:32 |
| 9 | D.S. | 19 | F. | Yes | + | 4,200 | 7 | 80 | | 13 | Pos. 1:512 |
| 10 | B.R. | 24 | F. | Yes | + | 16,200 | 4 | 84 | 1 | 11 | Pos. 1:320 |
| 11 | G.C. | 11 | M. | Yes | — | 10,650 | 12 | 87 | | 1 | —— |
| 12 | I.I. | 19 | F. | Yes | + | 14,250 | 6 | 93 | | 1 | —— |
| 13 | D.G. | 25 | M. | —— | + | 10,500 | 19 | 64 | 12 | 10 | Pos. 1:10,240 |
| 14 | L.M. | 30 | M. | Yes | + | 18,600 | 32 | 58 | 10 | | —— |
| 15 | F.R. | 25 | M. | Yes | + | 9,750 | 29 | 57 | 6 | 8 | Pos. 1:1,280 |
| 16 | E.F. | 21 | F. | Yes | + | 10,650 | 12 | 78 | 3 | | Pos. 1:2,560 |
| 17 | L.D. | 24 | M. | Yes | + | 2,950 | 4 | 71 | 20 | 4 | Pos. 1:80 |
| 18 | G.B. | 19 | F. | Yes | + | 15,000 | 12 | 71 | 2 | 15 | Pos. 1:1,280 |
| 19 | C.C. | 15 | F. | —— | + | 8,500 | 29 | 47 | 6 | 18 | Pos. 1:1,280 |
| 20 | E.C. | 25 | F. | Yes | + | 16,300 | 12 | 73 | 8 | 7 | Pos. 1:1,280 |
| 21 | S.S. | 36 | M. | Yes | + | 9,900 | 23 | 57 | | 20 | Pos. 1:80 |
| 22 | M.S. | 26 | F. | Yes | + | 13,500 | 18 | 63 | 4 | 15 | Pos. 1:5,120 |
| 23 | R.P. | 16 | M. | Yes | + | 16,100 | 12 | 76 | | 12 | Pos. 1:80 |
| 24 | D.M. | 5 | M. | Yes | + | 9,200 | 25 | 58 | 13 | 4 | Pos. 1:20 |
| 25 | R.R. | 28 | F. | Yes | + | 12,350 | 20 | 69 | 9 | 2 | Pos. 1:2,560 |
| 26 | L.G. | 17 | F. | Yes | + | 11,700 | 25 | 64 | 4 | 6 | —— |
| 27 | J.B. | 19 | M. | —— | + | 12,600 | 31 | 50 | 6 | 13 | Pos. 1:640 |
| 28 | J.B. | 21 | F. | Yes | + | 10,500 | 5 | 85 | 2 | 8 | Pos. 1:5,120 |
| 29 | S.A. | 10 | F. | —— | + | 8,900 | 31 | 48 | 10 | 11 | Pos. 1:40 |
| 30 | J.R. | 17 | F. | Yes | + | 11,250 | 17 | 69 | 5 | 9 | Pos. 1:1,280 |
| 31 | I.M. | 20 | F. | Yes | + | 10,550 | 19 | 73 | 2 | 6 | Pos. 1:320 |
| 32 | O.H. | 6 | M. | Yes | + | 14,450 | 32 | 61 | 4 | 3 | Pos. 1:80 |
| 33 | E.R. | 18 | F. | Yes | + | 18,750 | 20 | 72 | 5 | 3 | Pos. 1:1,280 |

Cases 34 and 35 presented with symptoms suggesting disease of the central nervous system. Case 34 was drowsy and had an abnormal degree of blurring of the medial margins of the optic discs, as well as tonsillitis with exudates. She complained also of a severe frontal headache.

Case 35 presented with fever, stiffness of the neck, drowsiness, photophobia and epistaxis. It was felt that she most likely had a meningitis. A lumbar puncture was done with normal findings. Her meningeal signs gradually faded and both liver and spleen became palpable.

Cases 37 and 38 both had marked tenderness in the right lower quadrant of the abdomen, together with fever. Case 38 presented with abdominal pain as well and a diagnosis of appendicitis was made. However, operation was withheld, as the patient appeared to be improving. In case 37 the abdominal findings were less definite, but appendicitis was again considered. Both of these cases had enlargement of the cervical glands and one of them had enlargement of the axillary and inguinal glands as well. Both had a positive Paul Bunnell test and a white cell count in keeping with infectious mononucleosis.

Cases 36 and 39 presented with fever, malaise and signs of pneumonia at the base of the left lung. In both cases there were increased markings in the hilar regions of the lungs by x-ray, suggestive of a bronchopneumonia. Both cases showed a white cell count typical of infectious mononucleosis and a positive heterophile agglutination test. Neither of them showed enlargement of the cervical or other superficial lymph nodes.

Case 44, a woman of 34, presented with a history of pain in the right loin on and off for 6 weeks, fever and anorexia for 4 days, and a temperature of 101.8 degrees. At no stage did she show any abnormality of the superficial lymph nodes, but there was marked tenderness in the right upper quadrant of the abdomen and in the right costo-vertebral angle. She had a positive heterophile agglutination test 1:160 and

TABLE II.

ATYPICAL CASES OF INFECTIOUS MONONUCLEOSIS (12)

| *Serial No.* | *Initials* | *Age sex* | *Throat inv.* | *Glands* | *White cell count* | | | | | *Heterophile agglutination* | *Other features* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *Total* | *P.* | *L.* | *M.* | *Others* | | |
| 34 | H.C. | 27 M. | Yes | — | 17,250 | 5 | 91 | | 4 | Pos. 1:28 | Drowsy, blurring of optic discs, headaches, tonsillitis. |
| 35 | L.D. | 12 F. | —— | — | 2,000 | 35 | 55 | 8 | 2 | Pos. 1:320 | Fever, stiff neck. L.P. normal. Meningitis was considered. |
| 36 | C.P. | 23 F. | —— | — | 8,850 | 21 | 60 | | 19 | Pos. 1:10,240 | Presented with signs of lt. basal pneumonia, confirmed by x-ray. |
| 37 | H.R. | 17 M. | —— | + | 19,000 | 46 | 30 | 2 | 22 | Pos. 1:2,560 | Tenderness in R.L.Q. abdomen. Thought to have appendicitis. |
| 38 | R.M. | 23 F. | —— | + | 12,900 | 22 | 66 | 2 | 10 | Pos. 1:80 | Tenderness in R.L.Q. with abdominal pain. Thought to have appendicitis. |
| 39 | L.W. | 34 M. | —— | — | 10,600 | 12 | 53 | | 32 | Pos. 1:512 | Fever, malaise, signs of left basal pneumonia. X-ray confirmed. |
| 40 | E.S. | 5 F. | Yes | + | 10,600 | 23 | 66 | 6 | 5 | Pos. 1:2,560 | Skin rash on trunk and limbs. |
| 41 | G.E. | 23 F. | Yes | + | 10,750 | 12 | 77 | 2 | 9 | Pos. 1:1,280 | Skin rash on trunk and limbs. |
| 42 | G.N. | 15 M. | —— | + | 8,100 | 19 | 70 | 7 | | Pos. 1:320 | Had acne conglobata, developed I.M. under observation. |
| 43 | D.M. | 21 M. | Yes | + | 15,200 | 16 | 60 | 7 | 17 | Pos. 1:80 | Skin rash on trunk and limbs. |
| 44 | R.H. | 34 F. | —— | — | 5,850 | 15 | 72 | 5 | 8 | Pos. 1:160 | Pain in loin off and on for 6 weeks. Marked tenderness R.U.Q. abdomen. |
| 45 | R.H. | 29 M. | Yes | + | 4,650 | 63 | 24 | 9 | 4 | Pos. 1:320 | Skin rash on trunk and limbs. |

a white blood count typical of infectious mononucleosis.

The remaining 5 cases were chiefly remarkable for the skin lesions which they showed. Case 42 was a case of acne conglobata of very severe grade, who was under treatment for this condition for several months, and who had a normal white cell count when first seen and for the first two months of treatment. He later developed a generalized enlargement of lymph nodes, a palpable spleen and the typical blood picture of infectious mononucleosis, together with a positive heterophile agglutination test (1:320). The other 4 displayed either a macular or papular rash on the trunk and limbs. In addition they had a sore throat with associated enlargement of the cervical lymph nodes, as well as fever, a typical blood picture and a positive heterophile agglutination test.

The disease as already stated is self-limited and treatment therefore need be only palliative or symptomatic. There is no place for the sulfonamides in this condition, and the antibiotics are unnecessary. In spite of the fact that these patients appear acutely ill and may run an alarming fever masterful inactivity is the proper therapeutic procedure.

It is apparent then that there is a typical pattern in infectious mononucleosis which is as follows. The patient, usually a young adult, has fever and malaise followed by a sore throat with pharyngitis which may go on to ulceration, enlargement of the cervical lymph nodes and frequently of other lymph nodes, a significant increase in the mononuclear leukocytes and a positive heterophile agglutination test.

Our main point in this presentation is in respect to those cases which showed the atypical picture. The nature of the condition known as infectious mononucleosis is still imperfectly understood. The suggestion is here made that it may represent a tissue reaction to some unknown factor. This possibility is particularly suggested by case 42, where infectious mononucleosis developed under observation in hospital in a patient with acne conglobata. In this respect it may be comparable to the tissue reaction which is shown in the group of so-called collagen diseases.

SUMMARY

1. We have discussed 45 cases of infectious mononucleosis, of which 33 have followed the typical pattern and 12 were atypical.

2. The mode of presentation and the subsequent course in the 12 atypical cases have been outlined.

3. The heterophile agglutination test has been discussed.

4. The suggestion has been put forward that infectious mononucleosis may represent a tissue reaction to some unknown factor.

This work has been carried out in The Vancouver General Hospital, under the supervision of the Chief of the Department of Medicine, Dr. G. F. Strong.

REFERENCES

1. FORSSMAN: Practical Bacteriology, Hæmatology and Parasitology, Stitt, Clough and Branham, 10th ed., p. 465.

## MANAGEMENT AND TREATMENT OF PELVIC ENDOMETRIOSIS*

**P. J. Kearns, M.S.C., M.D., F.R.C.O.G., F.A.C.S.†**

*Montreal, Que.*

DURING the twenty years from 1928 to 1948 that I directed our Pathological Laboratory at the Women's Pavilion of the Royal Victoria Hospital Montreal, 598 cases of heterotopic endometrial growth were diagnosed. Six of these cases showed severe rectal involvement. The preoperative diagnoses of plevic indurations with fixity of pelvic organs, which did not respond to treatment, demanding operative relief, revealed themselves microscopically as 72% mixed types of infection, 20% endometriosis, and 8% tuberculosis. The percentage of pelvic tuberculosis is high in the Province of Quebec: 75% of pelvic endometriosis was accompanied by microscopic evidence of inflammatory reaction.

The management and treatment of endometriosis of the pelvic organs will be directed by a knowledge of its etiology and of embryological growth factors. It becomes evident therefore that the fundamental histological training of the gynæcologist will show a sympathetic adherence to ideas expressed by his teachers. I was taught histology in the old Viennese school under the late Dr. O. Frankl who emphasized that a combined knowledge of histology and embryology makes for a sound

* Read before the Eighteenth Annual Meeting of the Canadian Medical Association, Section of Obstetrics and Gynæcology, Saskatoon, June 16, 1949.

† Assistant Professor of Obstetrics and Gynæcology of McGill University. Director Gynæcological Pathology Laboratory, Royal Victoria Hospital, 1928-48.

pathological diagnosis. I therefore favour the metaplasia theory of endometriosis. The histologist educated in the United States will necessarily favour the transplantation theory of Sampson.

The accepted theories of endometriosis are classified under the following headings: (*a*) transplantation theory of Sampson; (*b*) lymphatic migration of Halban; (*c*) metaplasia by Meyer; (*d*) ovarian metaplasia—conjointly expressive of the former. I will illustrate these findings directly from our own material.

The transplantation theory is supported by the following facts: (1) The findings of endometriosis in the tube lumen. (2) We see it transplanted into the ruptured ovarian follicle. (3) We see it transplanted by the hands and instruments into the abdominal incision. (4) We observe the facility of opaque fluid substances such as lipiodol, injected into the tubes to the peritoneal cavity. (5) The pooling of menstrual fluid in the vault of the vagina by tamponing during menstruation carries back flow into the tubes.

The adherents of the metaplasia theory are supported by the following: (1) The common finding of pelvic endometriosis where the tubes are shown to be blocked to lipiodol injection. (2) The finding of endometrial cysts of ovaries where the fundus uteri was long before removed. (3) The finding of endometriosis deep in U.S.L. and appendix muscularis. (4) The apparent arrest of endometriosis after removal of the gonads or giving of deep x-ray to pelvis (the uterine mucosa shows little atrophy changes). (5) Why is the Fallopian tube not infiltrated from within rather than from serosal inward? (6) Why does the isthmus uteri not become endometriotic? (7) Why in young girls with intact hymen and hæmatometra is the pelvis not filled by endometrial growths? (8) Why do the sub-cœlomic, the tubal sub-serosal and ovarian cortex tissues show stromal and decidual changes in normal pregnancy? (9) Why the constant metaplasia in cervical gland and portio epithelium? (They were formerly cœlomic epithelium) (10) Why do the routine sections through fetal pelvic peritoneum show similar serosal and mucosal hyperplasias in their normal development?

You will understand therefore why my personal sympathies lie with the metaplasia theory. We have in our teaching museum numerous models and histological sections of embryos showing how the intraembryonic mesoderm, which arises from the lateral sides of the primitive streak ectoderm develops first the medial vertebral somites, secondly the nephrogenic apparatus and thirdly the lateral column splits to form the primitive somatopleura and splanchnopleura. The somatopleura invades along the lateral nephrogenic process to form the Müllerian epithelium. The Müllerian apparatus therefore has inherent qualities of both epithelium and mesothelium. It is a mesothelial tissue and is capable of metaplastic changes in its life history.

### THE CLINICAL SYMPTOMS OF ENDOMETRIOSIS

The steroid menstrual toxin stimulation, from retained menstrual products, causes congestive hyperæmia of the pelvic organs with consequent fibrotic changes in the bowel, bladder, and ovaries, with resultant fibrosis of the uterus. The patient suffers emotional instability, from toxic absorption. Palpitation of the heart, nervous instability, headache in form of occipital pressure symptoms and indigestion with later rectal tenesmus with mucopurulent rectal discharge. Other organic disturbances are dysmenorrhœa and dyspareunia. Occasionally a metrorrhagia and menorrhagia with irregular indefinite lower abdominal pelvic pains are encountered.

### TREATMENT OF ENDOMETRIOSIS OF PELVIC ORGANS

The treatment of endometriosis is twofold. First all cases should be treated medically. (1) The best cure would be to establish pregnancy and arrest of menstruation. (2) Testosterone and light x-ray without total castration; if no relief of symptoms, and fair trial at pregnancy has been carried out, surgical ablation must be induced.

Before deciding upon operation a careful study of the lower bowel must be made. In 16 cases of intestinal obstruction caused by endometriosis at the Mayo Clinic, the average age was 39 years. Four of these were unmarried. There had been only three pregnancies with two living children. Eight patients complained of dysmenorrhœa. In four cases the menstrual habit was irregular for as long as six years. The symptoms of intestinal obstruction included abdominal pain in all cases; constipation at time of menstruation in

thirteen; abdominal distension in ten; rectal pain, vomiting and tenesmus in ten cases; blood in stools in three cases. Complete obstruction in sigmoid occurred in four cases and partial obstruction in six cases of severe bowel involvement in our own clinic. The possibility of endometriosis as a cause of intestinal obstruction should be kept in mind especially between the age limits of thirty to fifty years. Proctoscopic examination often shows only a narrow lumen with intact mucosa. Roentgenographic study usually shows a long inconstant filling defect, with sharp regular borders and intact mucosa. If the lesion is in the ileum the symptoms are less characteristic. Always consider the possibility of diverticulosis with infection of sigmoid and colon.

Indications for gynæcological surgery follow a failure from relief of symptoms by medical treatment. In young patients without pregnancy, the partial resection of ovaries is favoured in Randall's paper and supported by Meigs. Our method has been to carry the patient on palliative treatment as long as possible, then do total ablation of ovaries and if possible a total hysterectomy. Frequently it is advisable to leave a portion of cervix if the rectum is firmly adherent to it. The destruction of elastic fibres with replacement by a hyalinized connective tissue allows for easy tearing into bowel or bladder structures as compared with serosal to serosal adhesions in the pelvic inflammatory conditions. The treatment of intestinal obstruction due to endometriosis does not always necessitate bowel resection unless it is in the ileum. Ablation of the uterus and appendages with colostomy often allows for lower bowel restoration. We have recently restored function in a partially obstructed rectum by giving 10,000 R. within a period of one month.

The best treatment for the prevention of endometriosis is encouragement of early marriage with regular child bearing. The tamponing of the virgin vagina during menstruation should be prohibited by the health department. The wearing of cervix contraceptives allows for upward suction and retrograde drainage during coitus. The treatment of pelvic endometriosis is still in the controversial stage and various opinions exist.

The summary of the whole condition allies itself once again to the wise old adage: Some of us know but do not think logically. Some of us have had experience but have not learned. Some of us are lacking in good judgment or what others call "common sense". The trouble is that we are all human; so the old plain truths have to be revealed and repeated, or presented in forms to fit the passing moment.

BIBLIOGRAPHY

1. FRANKL, O.: *Irish J. M. Sc.*, 7: 303, 1932.
2. RANNEY, B.: *Surg., Gynec. & Obst.*, 86: 313, 1948.
3. GOLD, S. AND KEARNS, P. J.: *Am. J. Obst. & Gynec.*, 52: 840, 1946.
4. MCGUFF, P.: *Am. J. Obst. & Gynec.*, 57: 816, 1949.
5. RANDALL, C. L.: *J. A. M. A.*, 139: 971, 1949.

Medical Arts Bldg.

RÉSUMÉ

L'auteur note que l'endométriose est fréquente dans la province de Québec. Il décrit les théories actuelles de cette maladie, celle de la transplantation et celle de la métaplasie. Il explique pourquoi il adhère à cette dernière. Il passe en revue la symptomatologie clinique de cette maladie et en établit le traitement. Au début tous les cas doivent être traités médicalement (1) par une grossesse chez les femmes mariées; (2) par la testostérone et les petits traitements aux rayons-x. Si ce traitement donne un échec on aura recours à la chirurgie. Chez les jeunes patientes sans grossesse l'auteur prolonge le traitement médical puis fait une ovariectomie et si possible un hystérectomie totale. Il recommande de laisser une portion du col s'il est très adhérent au rectum. Ce traitement peut être suffisant dans les occlusions intestinales par endométrioses.

YVES PRÉVOST

## ADULT GAUCHER'S DISEASE*

**A. H. Squires, M.D., F.R.C.P.[C.],†**
**O. Kofman, M.D. and J. N. Cunningham, M.D.**

*Toronto, Ont.*

GAUCHER'S disease is a rare, often familial condition, that is distinguished by the presence of characteristic cells in the organs of the reticulo-endothelial system. It occurs most commonly in the first decade of life, and is considered to be a manifestation of a disturbance of lipoid metabolism which involves the cerebroside kerasin.

The following case report is of interest for a number of reasons. The case presents several typical features of adult Gaucher's disease, as well as some atypical ones, about which no reference could be found in the literature. The importance of considering this condition in any problem case in which splenomegaly exists is

* From the Department of Medicine, Sunnybrook Hospital, Toronto.

† Consultant in Medicine, Sunnybrook Hospital, Toronto.

demonstrated and the value of sternal marrow aspiration as a diagnostic procedure is illustrated clearly. The occurrence of the condition in a non-Hebrew patient, without any apparent hereditary or familial tendency, which although common is contrary to popular belief, is worthy of note. The insidious course of the disease and the age of the patient are significant.

## CASE REPORT

C.F.B., a male pharmacy student 24 years of age, was admitted to Sunnybrook Hospital in Toronto on October 26, 1948. His chief complaints were substernal tightness and aching pains in the left shoulder of 4 days' duration. His symptoms were described as being exactly like those that had preceded an illness 4 years before and which later developed into a pericarditis with effusion. The previous record indicated that the patient was apparently in his usual state of good health until March 15, 1943, when he first experienced a dull pain in the lower, substernal area. This pain increased in severity and spread upward to involve the entire substernal region as well as a considerable portion of the anterior chest wall on either side and both shoulder areas. It was aggravated by breathing. It gradually increased over a 12 hour period and at the height of the attack was so intense that the patient could scarcely breathe. Respirations were confined to short, shallow efforts because of the pain, and these were best accomplished sitting up. Moving about aggravated both the breathlessness and the pain. Cyanosis was not observed. After attaining maximum severity, the pain began to subside gradually. Following the acute phase of the attack he was examined by a physician and nothing abnormal was noted. A mild upper substernal and shoulder pain persisted but after about 4 days it disappeared completely and the patient felt perfectly well. Four similar attacks occurred in May and June of 1943 and in November and December of 1944. Examination in hospital on each occasion revealed no abnormality.

A 6th and more significant episode began on January 24, 1945. This attack was described as similar to the others with the exception that the pain persisted much longer after having reached its peak of intensity in a 12-hour period. The patient was admitted to Christie Street Hospital, Toronto on February 2, 2 weeks after the recurrence of the distress because of its persistence. A diagnosis of acute pericarditis with effusion was established. This was thought to be rheumatic in origin. No peripheral joint involvement was present at any time. Aspiration of the fluid in the pericardial sac was not attempted. It was noted during this period in hospital that the patient's skin was generally tanned and that the abdomen was difficult to examine because of excellent muscle tone. After a long period of bed rest he was well again in November, 1945.

During the next 3 years following November, 1945, he was able to carry on with little evidence of distress. During this period he noticed that he tired readily and became breathless on moderate exertion. He was aware of mild aching in his shoulders when he was tired. Otherwise, he was perfectly well. There was no change in weight.

On October 26, 1948, the patient was admitted to Sunnybrook Hospital. He stated that for a period of 4 days he had been aware of a discomfort in the substernal region similar to that which had been present prior to the onset of his previous illness. On changing position such as standing up or lying down he became aware of a vague tightness in the upper substernal and throat area which lasted about 15 seconds. There was also an associated ache in both shoulders, chiefly in the left. The mild chest and shoulder discomfort persisted. It increased slightly in severity and as noted above, it was aggravated by movement and exertion of any nature. Movements of his chest, especially deep inspiration, also increased the distress. There was slight malaise. His temperature was found to be just above 99° F. on several occasions during the 3 day period preceding admission. Because of the persistence of the symptoms and the similarity to the previous illness, the patient feared recurrence of pericarditis and was admitted to hospital for investigation.

During the functional enquiry it was learned that his appetite had always been fair and his food intake was normal. There were no urinary symptoms. There were no skeletal pains other than in the shoulders. His colour had always been generally dark. There was no hæmorrhagic tendency. Nothing else of importance was ascertained. There were no other significant past illnesses.

Personal and family history revealed that the patient was born in Toronto. He had never been beyond the border American cities in his travels. He was of Irish-French descent. No history could be obtained which was at all suggestive of hereditary disease.

At the time of admission the patient was noted to be a calm, moderately well nourished and well developed young adult male who appeared to be in no distress. Careful and comprehensive physical examination outside of the abdomen showed nothing abnormal except a slight generalized brownish pigmentation. Abdominal examination which was difficult because of tense musculature, revealed the presence of 2 masses. That on the right extended to a level 5 cm. below the 9th costal cartilage. A definite smooth sharp edge was detected. It was slightly tender and moved with respirations. This mass was thought to be an enlarged liver. The mass on the left side of the abdomen was large and extended down as far as the pelvis. It was firm, smooth and non-tender. It moved moderately well with respirations. A lower margin could be detected but medially the edge of the mass was difficult to discern as it disappeared deep to the rectus muscle although it seemed to extend toward the midline. No notch could be felt. This mass was thought to be a huge spleen, although its deep position suggested a retroperitoneal location. X-rays taken in 1945 showed in retrospect the presence of a shadow which was compatible with this mass.

After a 5-day period in hospital the patient's chest and shoulder discomfort disappeared completely. The temperature which had reached 100° F. daily during this period returned to normal. He felt well thereafter. Because of a low white blood count (3,000 per c.mm.) together with what was considered to be a huge spleen in a patient with a condition yet undiagnosed, a sternal marrow aspiration was done for possible assistance in diagnosis. Examination of the aspirated marrow stained with Hasting's stain, revealed many large cells of the type found characteristically in Gaucher's disease. These cells varied considerably in size, the majority of them being from 30 to 40 $\mu$ in diameter. They possessed either 1 or 2 nuclei which were usually situated eccentrically. The nuclei were relatively small and darkly stained. The cystoplasm occupied by far the larger part of the cell body. It was very pale staining and contained concentric fibrils about the nucleus. These cells were not foamy (Fig. 1). They numbered 5% of the marrow cells that were identified. The remainder of the marrow cells were normal.

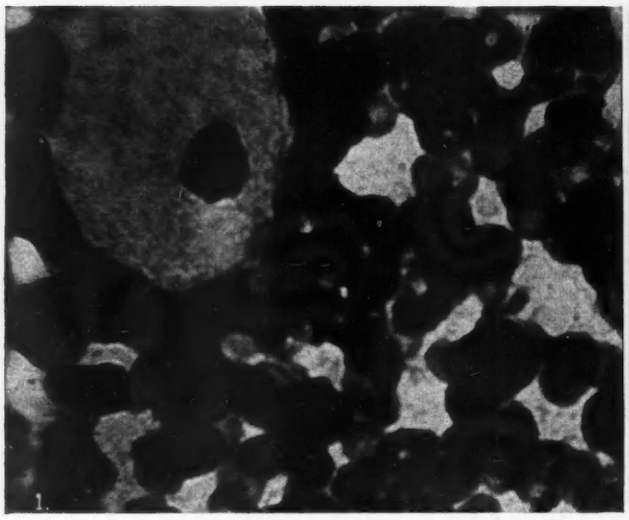
The presence of these cells was also detected in imprints and sections made from a bone marrow core. The finding of the typical Gaucher cells as described above definitely established the diagnosis of Gaucher's disease of the adult type. Further studies revealed the following findings: urinalysis, specific gravity 1.030, albumin, trace (persistent), sugar, negative, benzidine, negative, and microscopic, occasional white blood cell; hæmoglobin 96%, white blood count, consistently between 3,000 and 3,400 with a normal differential count, platelet counts were 210,000 and 150,000, sedimentation rate was 2 mm. in 1 hour. Liver function tests were normal. Three blood cultures were negative. The electrocardiogram revealed left axis deviation and negative T3.

Fluoroscopic and x-ray examination of the chest were normal. Barium swallow did not demonstrate the presence of œsophageal varices. A barium enema revealed that the splenic flexure was displaced downwards and medially by a large mass. An intravenous urogram showed that the kidneys were normal in size and shape. Soft tissue shadows of masses compatible with those of liver and spleen which were detected on abdominal examination, were clearly noted.

X-rays of the skeletal system revealed the following significant findings: the lower ends of the femora showed very early expansion. There was increased translucency of the central portion of the lower shaft and well marked thinning of the cortex. Immediately proximal to this osteoporotic change, there was an irregular translucency and in this portion of the shaft the medullary canal appeared more dense than throughout the remainder of the femur (Fig. 2). The right humerus presented increased translucency of the medullary canal. The appearance of the tibiæ suggested that there were very early changes in the medulla. The skull, spine, ribs and pelvis were not abnormal. Opinion: involvement of bones as above including the characteristic changes in the lower femora as in Gaucher's disease.

The importance of considering this condition in the differential diagnosis of an unexplained splenomegaly can readily be seen. The only conclusive diagnostic evidence is the finding of the Gaucher cells themselves. These may be obtained most readily by sternal marrow puncture as was done in the case presented. Splenic puncture and aspiration was not considered necessary for diagnostic purposes, especially as there is danger involved in such a procedure.

No reference could be found in the literature to indicate any association of pericarditis with Gaucher's disease. There was definite evidence of splenomegaly in the x-rays taken in 1945 at the time of the acute pericarditis with effusion. Because of the rather striking associations in this case, it is believed that the conditions might



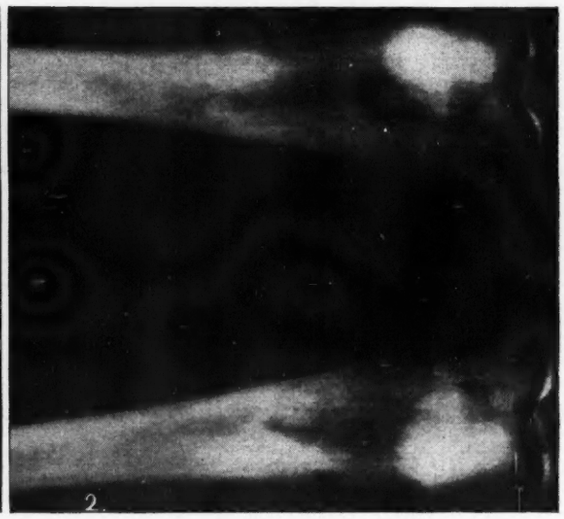


**Fig. 1.**—Showing typical Gaucher cells in bone marrow (Hasting's stain) x 90.
**Fig. 2.**—Lower ends of the femora showing the changes described.

## COMMENT

This case is an example of adult Gaucher's disease which is in so many ways different from the more commonly occurring Gaucher's disease in early childhood. The rather insidious onset as in this case is a frequent picture. The condition is slowly progressive but is compatible with longevity in some instances. Some of the more commonly described and typical features of Gaucher's disease are illustrated in the case presented. These in particular consist of a huge splenomegaly, hepatomegaly, leukopenia, brownish discoloration of the skin and certain changes in the bones as seen by x-ray examinations. As in the usual case, the external lymph nodes were not enlarged and biochemical tests of the blood plasma and liver function studies were all normal.

be related although the nature of the relationship remains obscure.

No adequate explanation can be given to account for the various attacks of pain in the upper substernal region and shoulder areas. It is likely that this feature also is a manifestation of the primary Gaucher's disease, possibly due to marrow infiltration by the abnormal cells or perhaps due to recurrent pericarditis.

Some features of typical Gaucher's disease, such as wedge-shaped pingueculæ of the subconjunctivæ, pigmentations of the lower extremities, thrombocytopenia and hypochromic anæmia were not present in this case.

There is no specific therapy for the case presented. Splenectomy is not indicated for this is known to have no influence on the progressive course of the disease. It is reserved for cases

that exhibit local abdominal symptoms caused by the splenomegaly or in which there is a hæmorrhagic tendency. The prognosis for this particular patient is fairly good and it is likely that he will be able to carry on with little handicap for many years.

REFERENCES
1. PACHMAN, D. J.: *Am. J. Dis. Child.*, **56**: 248, 1938.
2. GROEN, J. AND GARRER, A. H.: *Blood*, **3**: 1221, 1948.
3. GROEN, J.: *Blood*, **3**: 1238, 1948.
4. THANNHAUSER, S. J.: The Lipidoses, Oxford Medicine, London, 1940.
5. MORGAN, M. E.: *Lancet*, **2**: 253, 576, 1947.
6. SNAPPER, I.: Medical Clinics on Bone Diseases, 1943.

Medical Arts Bldg.

## CONGENITAL CYSTIC DISEASE OF THE LUNG*

**Robert M. Levine, M.D.**

*Montreal, Que.*

CONGENITAL cystic disease of the lung is an uncommon, though not rare condition, seen on occasion at autopsy and, in the past two decades, with the progress of thoracic surgery, more frequently by the surgical pathologist.

*Incidence.* — Bartholinus[1] recorded the first case in 1687 and an excellent clinical description of the disease is given by Laennec.[2] Fontanus described a case in the seventeenth century and Wood[3] quotes Sir Thomas Barlow, who in 1889 recorded the discovery of "an air cyst, of chestnut size, with a smooth lining and thin walls", in a child who died at three months of age. Koontz[4] in 1925 gathered 108 cases from the European literature, of which he considered less than one hundred to be true congenital cysts. Schenck[5] in 1937 collected a total of 381 cases, and Wood[6] in the same year added 48, seen at the Mayo Clinic. Liese quoted by Wiese[7] recorded some 400 cases in the same period. Extensive reviews, notably by Sellors[8] Dickson *et al.*,[9] and Adams *et al.*,[10] plus numerous reported cases, have brought the total to well over the six hundred mark. These probably only partially represent the number that have been actually studied, but are more than sufficient to establish the condition as an uncommon entity, rather than a medical curiosity.

Analysis of the available cases reveals the sex incidence to be about equal: males predominate slightly in Schenk's[11] original series.

The disease first manifests itself, according to age, in two distinct groups: (*a*) infants under one year; (*b*) adults over fifteen years. A few cases are found in the intervening period. The exceptional patient may have no symptoms referable to the chest and may live out his normal life span.

Secondary infection, or progressive distension of the cysts with air is usually the first indication of the existence of the disease, which is otherwise asymptomatic.

*Morphology.*—Klosk, Bernstein and Parsonnet[12] define cystic disease of the lung as "any condition in which the lung parenchyma is replaced by sharply defined cavities containing fluid or air". These may be congenital or acquired. The congenital type from a clinical and pathological point of view may be divided into two groups: (*a*) A large solitary cyst, the result of early developmental arrest, compressing the surrounding lung parenchyma, and generally exhibiting a bronchial communication which may be difficult to demonstrate. (*b*) Lung parenchyma replaced by extensive areas of multiloculated or uniloculated cysts with free communication of the cavities and the bronchial tree. These are formed from the more peripheral bronchi and bronchioles, the result of arrest at a later stage of lung development.

The true congenital cyst of the lung may be of varying size and extent. It exhibits a regular and constant epithelium of the pseudostratified ciliated columnar or cuboidal respiratory type and an erratic distribution of the supporting musculature, cartilaginous tissue, and mucous glands. The disease is usually unilateral but may involve both lungs.

Acquired cystic disease, on the other hand, is usually associated with respiratory tract infection and the production of endo- or peri-bronchial partial obstruction, followed by overdistension and rupture of corresponding alveoli with bleb and bullæ formation. Histologically, here, the sac wall is composed of compressed pulmonary parenchyma usually containing carbon pigment. There is no epithelial lining.

*Pathogenesis.*—Koontz in his extensive review considered that stenosis of the bronchi was the essential lesion in these cases, and that dilatation of the bronchioles and air spaces distal to the obstruction was secondary. Wolman[13] concluded that buds from the trachea become pinched off during embryologic development,

* From the Department of Pathology, Pathological Institute, McGill University, Montreal, Canada.

with the independent differentiation of these forming a closed system of cysts.

It appears logical from the morphological character of these cysts that they are of congenital origin, arising during the development of the lungs by a pinching-off of portions of the main lung buds or their derivatives. Mallory[14] has pointed out that outgrowths of buds of bronchial tissues from the trachea or major bronchi into the mediastinum are not infrequent. That similar bronchial outgrowths may develop within the lung itself is not improbable. Those that ultimately become pinched off and isolated may be air containing, in which case they disappear following the absorption of their contents. Those in which fluid is secreted eventually distend, rupture and communicate with an adjacent bronchus.

The pull of the rapidly expanding thoracic cage, and the accumulation of fluid secreted by the respiratory epithelium may both contribute to the cystic malformation of the dichotomously branching, developing, bronchial tree.

Recently Norris and Tyson[15] have studied serial section reconstructions of polycystic lungs, and have concluded that the fundamental lesion appears to be focal segmentation preceded or followed by focal dilatation of the small bronchi and bronchioles. When the bronchi are broken up into isolated segments, some of these persist as gradually enlarging cysts. They relate these lesions to those of the polycystic kidney, liver and pancreas.

Peirce[16] is of the opinion that the developmental pulmonary cyst is a rare lesion which must be roentgenographically evident from birth and histologically proved.

Two representative cases have recently been encountered by the author, one occurring in an infant, the other in an adult, both treated successfully by pneumonectomy. These satisfy both clinical and pathological criteria, and are considered of sufficient interest to report.

### CASE 1

Baby E.McD. This four-month old female infant was admitted to The Children's Memorial Hospital, Montreal with a history of daily "choking spells", since the age of three weeks. She was a normally developed full term infant at birth, and her first episode, noted by her mother, occurred following a feeding. Blood-streaked, mucoid, sputum was raised on two or three occasions prior to admission.

*Physical examination.*—No abnormalities were found other than an impaired percussion note over the right scapular region. Hæmoglobin 10.3 gm./100 c.c., white blood cells, 15,000. Differential blood count, normal. Mantoux negative 1:10,000. Blood Wassermann, negative.

X-ray examination on October 7, 1947, revealed on comparison with previous films taken at Soldiers' Memorial Hospital in New Brunswick at the age of eight weeks: "a soft tissue mass occupying the right upper lung field. It has increased in size from July 22 to September 6, 1947. Between September 6 and October 7, the soft tissue mass which apparently was a fluid filled mass, and probably multilocular, communicated with a bronchus and part of the fluid drained away, to be replaced by air."

"I believe the most likely diagnosis is a congenital fluid filled cyst of the lung which has within the past month ruptured into the right main bronchus. The involved lung now occupies the space that would normally be occupied by an upper and middle lobe." (Dr. D. L. McRae).

A right thorocotomy was carried out on October 8; the lung was freed from the densely adherent parietal pleura. During this procedure the infant's condition became precarious (impending shock) and the operation was terminated. A successful right pneumonectomy was later performed on October 22nd, by Dr. R. R. Fitzgerald, from which a successful and uneventful recovery was made.

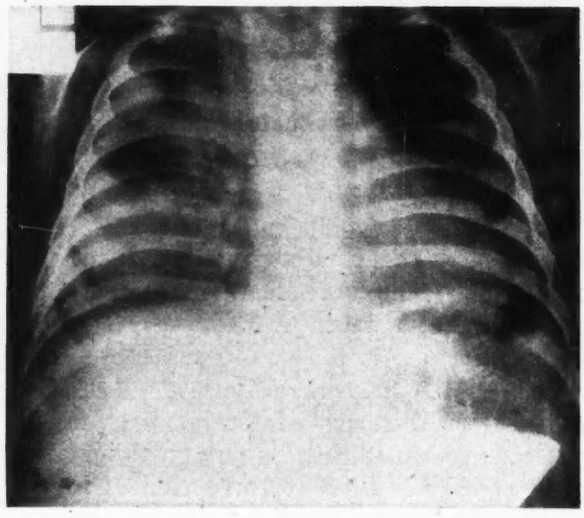


**Fig. 1.** (Case 1).—Note cystic mass occupying the right upper lung field.

*Pathology report.*—(Dr. F. W. Wiglesworth.)*

*Gross.*—Specimen consists of the right lung weighing 58 gm. It is pale red in colour and soft to palpation. The lower and middle lobes are nodular to palpation. The costal surfaces of the middle lobe, the lower part of the upper and anterior part of the lower lobe have surfaces where the visceral pleura has been denuded. The lobes are held together firmly by adhesions. The fissures are not visible on the mediastinal surface. Pressure over the lung causes sanguinous, mucopurulent fluid to be extruded from the bronchi which are not dilated grossly.

Following fixation the lung was sectioned so that the incision cut the bronchi in cross section. There are cysts which are thin-walled, in the following regions: (1) In the apical and apico-posterior segments of the right upper lobe measuring 0.8 x 1.5 x 4.0 cm. This extends down into the lateral middle segment of the right middle lobe. (2) Subpleurally with ragged lining in the middle basal segment, measuring approximately 2.0 cm. in diameter, and extending superiorly nearly as far as the dorsal segment. Later examination showed this to be an abscess cavity.

* Pathologist in Chief, The Children's Memorial Hospital, Montreal, Que.

Further examination of the fixed specimen shows cyst No. 1 to be irregular in diameter, with loculations. In the inferior part of the posterior wall of the cyst there is an oval yellowish projection. The cut surface of the lobe showed marked prominence of the lobular septa with collapse of the alveolar lobules. The tissue has a slight yellow colour, suggesting the presence of fat.

*Microscopic examination.*—(1) A section from the right upper lobe shows a pleura which is considerably thickened. The innermost layer of the pleura is predominantly fibrous and is thicker than normal, suggesting that there has been previous inflammation. Superimposed on this is young granulation tissue, associated with extensive hæmorrhage. The pleura is infiltrated with a moderate number of macrophages and polyblasts. The septa are somewhat widened, possibly due to œdema, and contain foci of lymphocytes. The alveoli at some distance from the cyst are relatively normal, except for a moderate degree of recent atelectasis. Their walls appear normal while the lumen contains a few polymorphonuclears. In the neighbourhood of the cyst and subjacent to the thickened pleura, the alveoli show quite marked changes. These consist of epithelization of the inner wall by cuboidal epithelial cells. In some areas this epithelization is so marked that it produces gland-like alveoli. In addition their walls are thickened, mainly by connective tissue. There are a few macrophages, both in the alveolar walls and in their lumina.

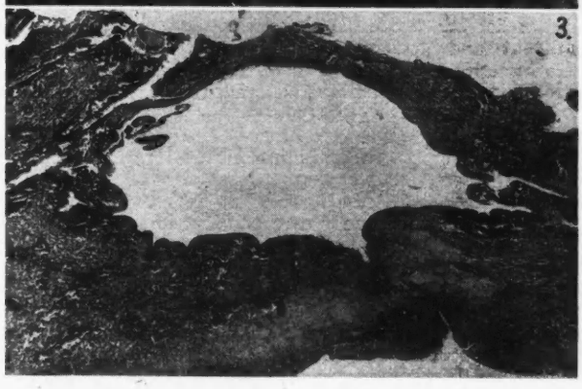




**Fig. 2.**—Gross specimen, section of upper lobe to show cyst in apical and apico-posterior segments.
**Fig. 3.**—Section of cyst. Note intimate relation to bronchi at right and left. Trichrome stain x 10.

The bronchioles and small bronchi show a normal mucosa, submucosa and muscularis. There is a mild peri-bronchiolar and peri-bronchial fibrosis, associated with a mild inflammatory infiltrate, of lymphocytes and macrophages. The large bronchi show occasional thin foci of lymphocytes and some slight increase in connective tissue outside the muscular wall. Many of their lymphatics contain numerous cells, both lymphocytes and polymorphonuclears. Otherwise, the bronchi are essentially normal.

The cyst present in this section is intimately associated with two large bronchi, from which it is separated only by mucosa and the submucosa of the bronchi. Eight sections in serial were mounted and no communication with the cyst and bronchi could be made out. The muscular wall of the bronchi at a point where the cyst impinges on it has disappeared. As it is complete elsewhere in the bronchi, this disappearance is possibly due to pressure atrophy.

The wall of the cyst, in the main, consists of fibrous tissue of greatly varying thickness. In some areas there is a wide band of connective tissue separating it from the lung parenchyma, while in other areas the wall is about the thickness of the bronchiolar submucosa. The wall contains a few inflammatory cells of chronic type, and large branching fibroblasts, with occasional cells which in appearance suggest that they are muscle. The latter are very few and far between. The lining cells consist of acidophilic cytoplasm with pyknotic nuclei. They cannot be positively identified as epithelial cells as their shape is markedly distorted. In some places they appear to be actual fibroblasts, while in other areas only a reddish cytoplasmic lining can be seen. They show marked degeneration. One clump of inflammatory cells is present in the lumen.

In one section, at one point in the cyst wall, is a tiny clump of partially desquamated stratified columnar cells with oval vesicular nuclei. One of the surface cells shows a row of cilia. The cells of the deeper layers are partially separated one from another and are only partly attached to the underlying fibrous tissue. In

spite of the partial desquamation and separation of the cells resulting in poorly defined architecture, there is no doubt but that these are ciliated stratified columnar cells of the respiratory system.

Further sections of the block containing the cyst were examined in serial section. The histopathology is essentially the same. At one point it was thought a small bronchus opened into the cyst. Neighbouring sections were taken, but unfortunately, small flaws in sections at the important site preclude the possibility of proving that this bronchus did open into the cyst. Elastic tissue stains fail to demonstrate elastica in the wall of the cyst. No very typical bronchial epithelium was found in these sections, but there is sufficient I think to conclude that they are of bronchogenic origin.

2. A section of the lower lobe shows an even more marked pleural reaction, both with increased fibrosis and increased granulation tissue formation. Otherwise it is similar to the previous section. This inflammatory reaction of the pleura is most marked over the area of the abscess to be described. The other half of the section shows only loose areolar synechiæ, in addition to the normal pleura layer.

The alveoli in the more normal portion of the lung are collapsed, and contain a few macrophages, particularly beneath the pleura. In this area there are several long slit-like spaces, apparently in septa. They are not lined by endothelium and their appearance and situation would suggest that they are due to an interstitial emphysema. The alveoli near the abscess show fairly marked changes characterized by marked epithelization and fibrosis of the walls, and they contain numerous macrophages in their lumen.

Many of the macrophages are very granular in appearance, and undoubtedly contain fat. A few alveoli in addition contain neutrophil leucocytes, and here and there fibrous plugs are present in alveolar spaces, indicating healed pneumonia.

The abscess lies beneath the pleura and consists of an irregularly defined cavity, surrounded by a small amount of fibrous tissue, and a moderate number of blood vessels, and numerous inflammatory cells of various types. The latter consist in the main of granular macrophages, neutrophil leukocytes and lymphocytes. The abscess wall merges indefinitely with surrounding lung tissue, which shows marked secondary changes. No pus was found in the lumen. It is impossible to state whether this chronic abscess was originally a cyst or not as no identifying structures are present.

### DIAGNOSIS

(1) Congenital bronchial cyst of right lung, situated in the apical and apico-posterior segments of the upper lobe and the lateral middle segment of the middle lobe. (2) Abscess in middle basal segment of lower lobe of right lung. (3) Chronic atelectasis of lung most marked in upper lobe. (4) Fairly diffuse interstitial fibrosis with epithelization of the alveoli, most marked in upper lobe. (5) Mild peri-bronchitis and peri-bronchiolitis with slight fibrosis. (6) Pleuritis.

### CASE 2

Miss K.B., aged 32 years, was admitted to the Royal Victoria Hospital, Montreal, in September, 1948.

In December, 1946, she had been treated at another hospital for extensive lobar pneumonia of the left lung, associated with multiple cysts. At this time a pneumonectomy was recommended, but refused by the patient. In June, 1948, she was hospitalized in another city for repeated attacks of hæmoptysis and was subsequently referred to the Royal Victoria Hospital with a view to pneumonectomy being performed.

On her admission the patient gave a history of intermittent and spasmodic cough, productive of profuse frothy and occasionally blood-streaked sputum, dating from infancy. She stated that she felt generally "well", but noted that she was subject to frequent "colds" and upper respiratory infection. She also complained of a dull pain intermittent in character, in her left chest, of two years' duration. Physical examination revealed small respiratory excursions with diminished breath sounds over the left lung base. Tubular breathing was noted over the left hilus.

On September 10, an x-ray examination of the chest was carried out. This revealed "emphysematous bullæ, left upper lobe, of undetermined etiology, marked resolution of pleurisy with effusion, left base. Question of emphysematous bullæ, right apex" (Dr. C. B. Peirce). These films, when compared with a previous set taken in Quebec City on June 22, 1948, revealed a subsidence of the left-sided pleurisy with effusion and of the multiple fluid levels in the bullæ of the left upper lobe, noted at this time.

A bronchogram was subsequently carried out on this patient, and revealed bronchiectasis of the left lower lobe.

Four sputum examinations were negative for acid-alcohol fast rods. The hæmoglobin was 98%; white blood cells 8,200. A complete hæmogram revealed no evidence of any primary blood disease. A diagnosis of cystic disease of the left lung and chronic bronchiectasis was made.

A left pneumonectomy was performed on September 21, by Dr. C. A. McIntosh. The patient made an uneventful recovery and was discharged on October 4.

*Pathology report.*

*Gross.*—Specimen consists of a left lung complete, the pleural surface of which is covered by shaggy densely adherent grey-white to dark brown tags of fibrous tissue. The medial basal segment of the lower lobe in the fixed state is rubbery firm in consistency and grey-white in colour as compared with the rest of the lung which is moderately spongy and soft in texture. Bisection of the

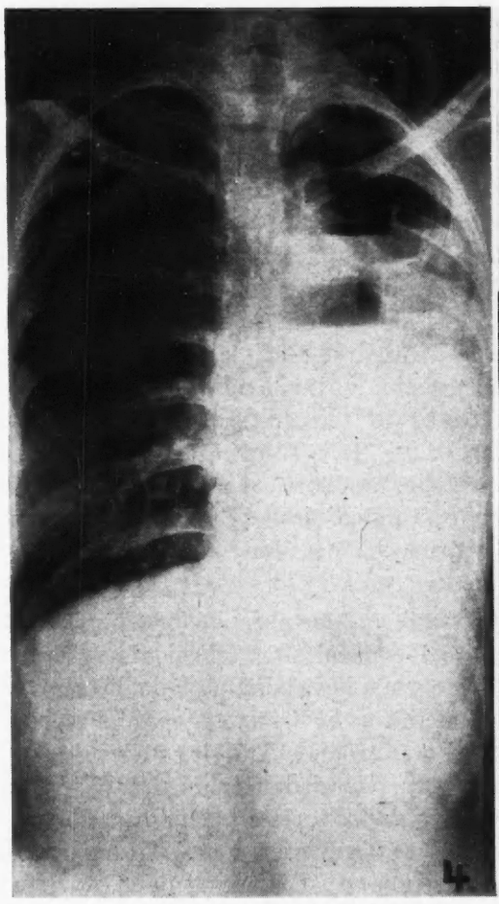
lung reveals both divisions of the upper lobe to be architecturally distorted, normal lung tissue, being replaced by large thin walled cystic cavities measuring 4.5 cm. in diameter, in one instance grading down to small pin head sized cavities. The lower lobe exhibits compressed whorls of grey-white homogeneous tissue in which small yellow rimmed cystic cavities are irregularly exhibited. This area has a Swiss cheese appearance and presents fine pink strand like infiltration about one zone. The whole lung presents the appearance of a large markedly distorted honeycomb.

*Microscopic examination.* — Sections show in one area a thickened pleura adherent to which is a hæmorrhagic fibrinous exudate. Subjacent lung parenchyma in this area shows dilated distorted and ruptured acini in some zones and compressed and atelectatic tissue in others. Variable infiltration of the parenchyma both intralveolar and interstitially with lymphocytes, plasma cells, eosinophiles and pigmented macrophages is exhibited, more particularly in the compressed collapsed atelectatic areas. The most prominent feature of the sections examined is the presence of dilated cystic cavities; these are lined by typical respiratory ciliated pseudostratified columnar epithelium — in some areas flattened and attenuated—and are of variable size and uneven distribution. Their epithelium is supported by loose and dense connective tissue, lightly to moderately infiltrated with lymphocytes, plasma cells and macrophages, and in turn by a smooth muscle layer—present in some areas, partially or totally absent in others. Similarly submucosal tubulo-alveolar compound mucous glands are exhibited in some zones and not in others. Irregularly distributed cartilage plaques are evident. Perimuscular connective tissue is variably infiltrated with the cellular exudate described above, which in rare areas is densely and focally concentrated. From the above description it is evident that differentiation of cysts and bronchi showing inflammatory and degenerative changes is difficult.

Throughout many areas examined fibroblastic activity pericystic and perialveolar in distribution, is evident.

### ANATOMICAL SUMMARY

Exudative proliferative and productive bronchitis and bronchiolitis with areas of atelectasis and pneumonitis and hæmorrhagic extravasa-



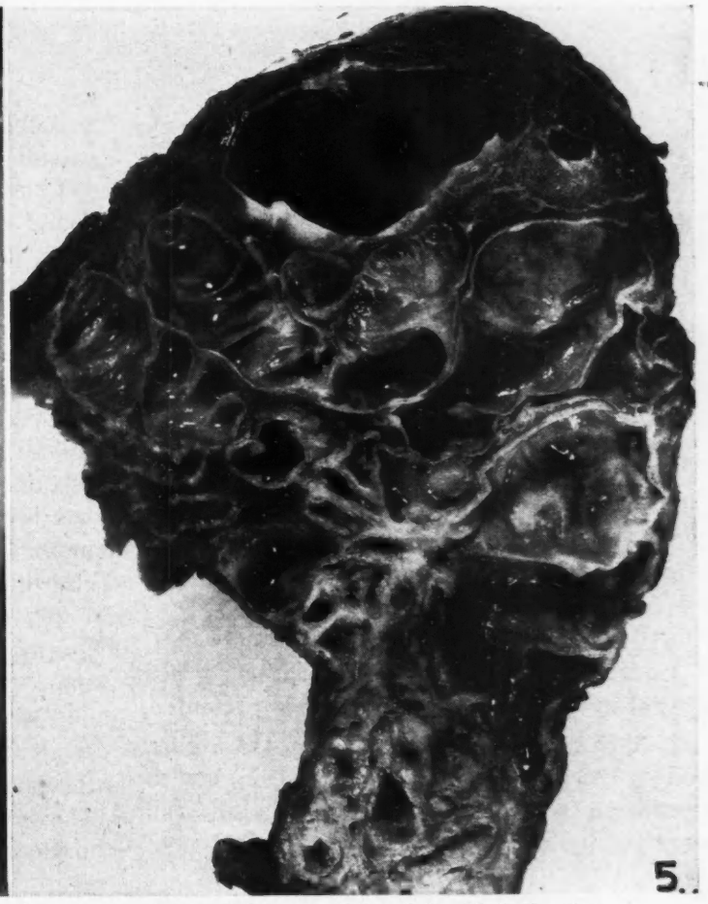


**Fig. 4.** (Case 2).—Note the emphysematous bullæ, left upper lobe; left sided pleurisy and multiple intracystic fluid levels. **Fig. 5.** — Gross specimen; note "honeycomb" appearance.

tions with hæmosiderosis and multiple cysts. *Note*: In view of history and structure of the cysts, they may be considered to be of developmental origin.

### COMMENT

The pathological diagnosis was made in the main in these cases on the basis of the histologically demonstrable respiratory epithelial lining in each of the cysts. The erratically distributed peri-cystic supporting cartilage plaques, muscularis and mucous glands were a prominent feature in Case 2.

Bronchial and cystic intercommunication were grossly evident in Case 2, and though not conclusively proved histologically, in the instance of the solitary cyst (see Case 1), can be postulated to have existed because of the clinical and radiological evidence of repeated filling and emptying of the cavity.

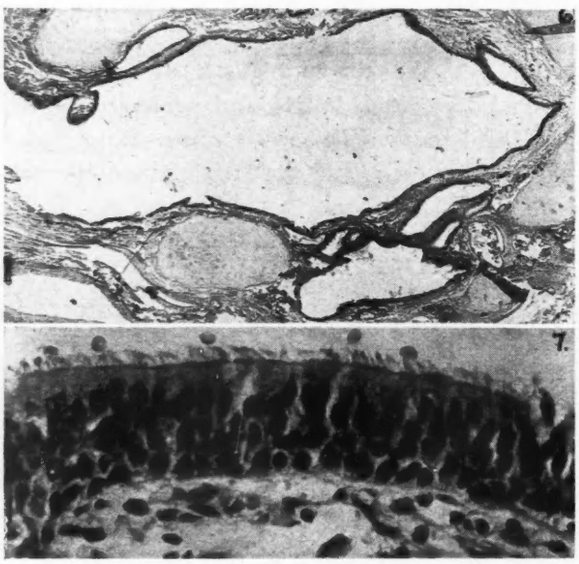


**Fig. 6.**—Section showing respiratory epithelium of cyst wall. Hæmatoxylin and eosin x 20. **Fig. 7.**—Higher magnification to show detail of ciliated respiratory epithelial lining. Hæmatoxylin and eosin x 200.

### SUMMARY

1. A brief review of the literature of congenital cystic disease of the lung is presented.

2. Two cases, representative of the solitary and polycystic disease are recorded; one occurring in an infant, the other in an adult. Both were treated successfully by pneumonectomy.

I wish to express my thanks to Dr. C. A. McIntosh and Dr. R. R. Fitzgerald for permission to report these cases, and to Dr. Theo. R. Waugh for his interest and constructive criticism in the preparation of this paper.

### REFERENCES

1. BARTHOLINUS, T.: In Malphigii's Opera Omnia, R. Littlebury, London, p. 349, 1687.
2. LAENNEC, R. T. H.: A Treatise on Mediate Auscultation and on Diseases of the Lungs and Heart. Translated by a member of the College of Physicians and edited by Theophilus Hebert, M.D., H. Bailliere, London, 1846.
3. WOOD, W. B.: *Proc. Royal Soc. Med.*, **33**: 335, 1940.
4. KOONTZ, A. R.: *Bull. Johns Hopkins Hosp.*, **37**: 340, 1925.
5. SCHENK, S. G.: *Arch. Int. Med.*, **60**: 1, 1937.
6. WOOD, H. G.: *J. Thorac. Surg.*, **6**: 634, 1937.
7. WIESE, O.: *Zentralbl. f. d. ges. Tuberk-Forsch.*, **55**: 1, 1942.
8. SELLORS, T. H.: *Tubercle*, **20**: 49, 1938.
9. DICKSON, J. A., CLAGETT, O. T. AND MCDONALD, J. R.: *J. Thorac. Surg.*, **15**: 196, 1946.
10. ADAMS, W. E., PHILIPS, F. J. AND HANNI, J. W.: *J. Iowa M. Soc.*, **36**: 425, 1946.
11. SCHENK, S. G.: *Am. J. Radiol.*, **35**: 605, 1936.
12. KLOSK, E., BERNSTEIN, A. AND PARSONNET, A. E.: *Ann. Int. Med.*, **24**: 217, 1946.
13. WOLMAN, J.: *Bull. Ayer Cln. Lab.*, Pennsylvania Hosp., **12**: 49, 1930.
14. MALLORY, T. B.: *New England M. J.*, **222**: 237, 1947.
15. NORRIS, R. F. AND TYSON, R. M.: *Am. J. Path.*, **23**: 1075, 1947.
16. PIERCE, C. B.: *Am. J. Roentgenol.*, **44**: 848, 1940.
17. FITZGERALD, R. R.: Personal communication.
18. HERBUT, P. A.: Surgical Pathology, Lea & Febiger, p. 166, 1948.

# CASE REPORTS

## URETHRAL CALCULI*

**F. G. Mack, M.B.(Tor.), F.R.C.S.[C.], F.A.C.S.**
**and**
**M. L. Mador, M.D.(Tor.)**

*Halifax, N.S.*

Although by no means a rarity, urethral calculi are a rather uncommon occurrence. LeComte in a series of 2,900 urological cases found only seven cases of urethral calculi. Up until 1943, Lane found only 39 cases of urethral calculi. The calculi are classified as either primary or secondary. The primary ones form in the urethra, while the secondary ones have their origin elsewhere in the urinary tract and become arrested in the urethra. True primary calculi are rare. It is frequently difficult to be certain whether the stone is a primary one. It has been postulated that a laminated stone is never a primary one, but must have arisen elsewhere.

The prostatic and membranous portions of the urethra are the usual sites of calculous formation. There may be a single stone present or multiple calculi, as in Civiale's case where 230 small stones were found. The size varies greatly, the largest one recorded weighing 1,050 grams. The causative factors usually found are inflammation of the urethra, trauma of the canal, urethral stricture and congenital defects. Balch

* From the Department of Urology, Victoria General Hospital, Halifax.

reports a case of six calculi formed behind a stricture and removed by external urethrotomy. In the case of secondary calculi, these may become arrested in the narrower parts of the urethra (Fig. 1).

The symptoms will vary greatly. A primary stone may give some dysuria, gradual narrowing of the urinary stream, and a chronic urethral discharge as in the case to be reported. Secondary stones arising in the upper urinary tract may give colic or ureteral tenderness. Bladder calculi coming down will give severe pain or acute retention. Both types of stone will give rise to urinary obstruction and infection with possible complications such as acute prostatitis,

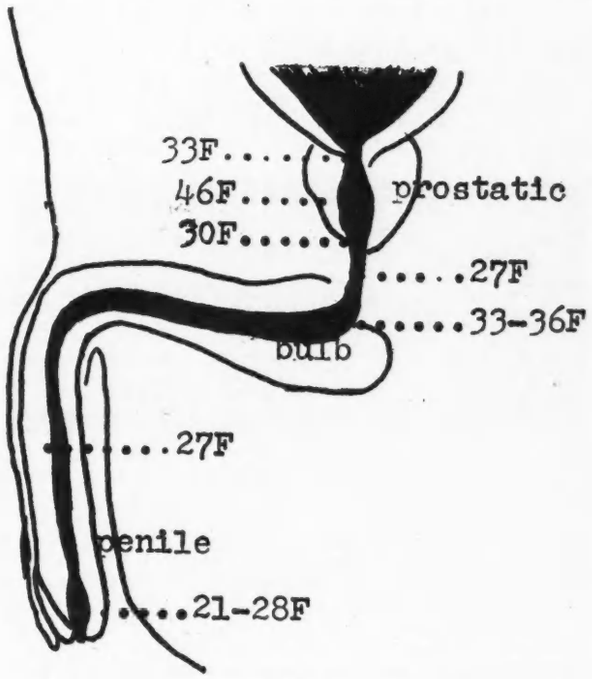


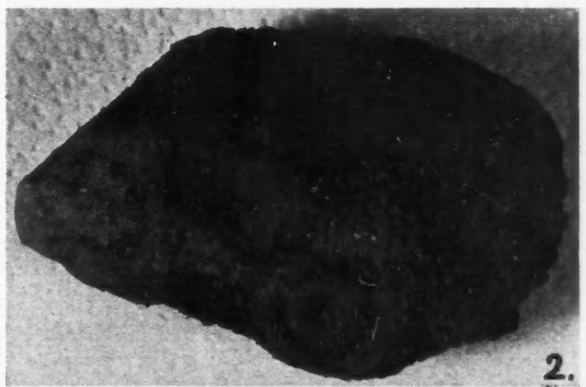

**Fig. 1.**—Variation in calibre of the normal male urethra (McCrae).

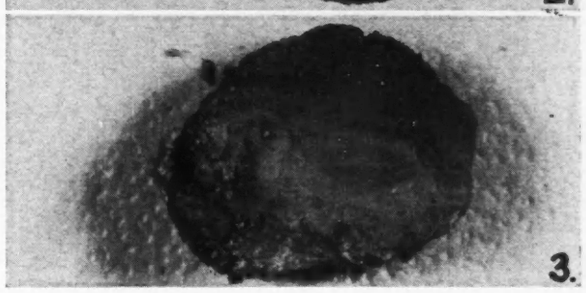
prostatic abscess, peri-urethral inflammation, scrotal or perineal fistulæ, etc.

The diagnosis is usually easy. The history of pain and sudden obstruction will suggest calculus impaction. Inspection and palpation will demonstrate a hard swelling in many cases. The clicking elicited by passage of a sound, x-ray of the urethra, and urethroscopic examination will all aid in the diagnosis.

The treatment will vary with the size and location of the stone. Occasionally the calculus may be pushed back into the bladder and removed transurethrally or suprapubically. They may sometimes be grasped through the urethroscope and extracted. Loeb has described a method of "floating expulsion" which he has successfully employed. External urethrotomy must often be resorted to.

P.S., a 61 year old white male, was admitted to the urological service of the Victoria General Hospital with a complaint of burning on urination. There was also narrowing of the stream, intermittent cloudiness and blood in the urine, and leaking from the under surface of the penis. He had been seen on two previous admissions to hospital. The first time, in July 1947, he was admitted with perineal abscesses, a suprapubic abscess, and marked stricture of the urethra. The abscesses were drained and the stricture successfully dilated to No. 26 F. Investigation for tuberculosis was negative. His second admission in October 1947, revealed a breaking down of the healed abscesses. Suprapubic cystotomy was performed. The urethra was again dilated and on healing of the sinuses, the suprapubic wound was allowed to heal. He also had vague dyspeptic symptoms and a gastro-intestinal series showed only a




small duodenal diverticulum. Intravenous pyelogram was normal.

On the present admission, (July 1949), examination revealed a hard, walnut sized swelling just posterior to the penoscrotal junction. There was a small sinus opening in each side of the scrotum. These could not be probed more than one cm. A soft rubber catheter would not pass beyond the swelling. A filiform was passed to the bladder, but passage of the finest follower failed. A metal sound elicited a typical clicking. Non-protein nitrogen was 38 mgm. %. Wassermann negative. Intravenous urogram was entirely normal, no calculi being seen. Remainder of examination was essentially normal. A diagnosis of urethral calculus was made.

At operation, external urethrotomy was deemed advisable because of the size of the calculus. The urethra showed whitish plaque formation at the site of the stone. A Foley catheter was guided to the bladder and the urethrotomy wound closed in layers. A small rubber drain was left in. The apparently blind sinuses were laid open.

The calculus (Figs. 2 and 3) weighed 7.5 gm. It measured 1½" x ¾". The surface was rough, and on section the laminated construction was revealed. Analysis of the stone revealed that the outer layer was partly organic with ammonia, calcium, phosphate and cystine

radicals, and the inner layer inorganic, with ammonia, phosphate, cystine and cholesterol present.

The postoperative course was uneventful, until the fifth day, when the patient began to complain of abdominal discomfort and belching. Examination revealed some abdominal distension, but no definite tenderness. Electrocardiogram was normal. In spite of all measures, the patient's condition rapidly deteriorated and he expired on the eighth postoperative day. Autopsy revealed a perforated duodenal ulcer and acute pancreatic necrosis. The urethra showed an irritative leukoplakia.

SUMMARY

The subject of urethral calculi is briefly discussed and a case presented. This was a large stone, formed some time within 22 months, unaccompanied by pain, and of the mixed variety. Otherwise normal urinary tract, except for urethral stricture. External urethrotomy was employed for its removal. The presence of a leukoplakia in the urethra is a very interesting finding.

BIBLIOGRAPHY

1. THOMSON, J. W.: *Brit. M. J.*, **2**: 381, 1933.
2. HOLMAN, C. C.: *Brit. M. J.*, **1**: 1072, 1935.
3. HESS, E.: *Brit. J. Urol.*, **2**: 44, 1930.
4. DRESSLER, L.: *Urol. & Cutan. Rev.*, **38**: 63, 1934.
5. BALCH, J. F.: *Am. J. Surg.*, **26**: 391, 1934.
6. LOEB, M. J.: *J. Urol.*, **60**: 640, 1948.
7. LANE, C.: *Urol. & Cutan. Rev.*, **47**: 363, 1943.

## BRAIN TUMOUR WITH SYMPTOMATIC EPILEPSY AND MENTAL SYMPTOMS*

**F. J. Edwards, M.D., C.M.**

*Ponoka, Alta.*

**and**

**H. H. Hepburn, M.D., C.M., F.R.C.S.(Edin.), F.A.C.S., F.R.C.S.[C.]**

*Edmonton, Alta.*

This case is presented chiefly to emphasize the importance of considering brain tumour as the possible cause of epileptiform seizures occurring for the first time in patients at an age beyond that at which idiopathic epilepsy usually commences. As Walshe[1] states, "These (generalized fits) may be the initial manifestation (of an intra-cranial tumour) occurring when physical examination of the patient reveals no abnormal physical signs. Therefore, when this happens at a period of life later than that at which idiopathic epilepsy commonly begins, *i.e.*, after the early 20's, the possible presence of a tumour should be borne in mind, and the course of the case carefully observed". It also serves to point out that personality disturbances on an organic basis frequently seem to be psychogenically determined by the pre-morbid type of the patient's personality.

Mrs. A.B., 74 years old, was admitted to hospital on October 16, 1948. She was seen by two physicians prior to admission. The evidence stated in part that she was becoming more and more irritable and demanding; that she was impossible to live with; that she had had epileptiform seizures for eight to ten years, and that these fits were followed by confused periods of several hours in duration; that she had a considerable degree of cerebral arteriosclerosis. Prior to admission, in court, she denied the evidence relative to her behaviour, saying that practically everything said about her was a lie. On admission she was described as demanding, as well as resentful at being admitted to hospital.

Her mother died at 72 from "stroke"; her brother died at 60 from "stroke". The patient had a grade ten education, plus normal school. She had taught school for ten years. Her husband died in 1940. Information from the relatives regarding her previous personality revealed that "as long as they could remember" she had been envious, whining, jealous and demanding. They could seemingly never satisfy her needs, and she was given to tantrums, with screaming, weeping and threatening to obtain her ends. All of these particularly disagreeable traits had become accentuated over the years. She had been tried in nursing homes and she either gave notice and walked out, or she was asked to leave because of her behaviour. Her epileptiform seizures dated back to 1933. The outside history suggested that they were of grand mal type. She was confused for several hours after each fit. More recently, she had had short amnesic periods. There was some evidence that she may have been experiencing auditory hallucinations just prior to admission.

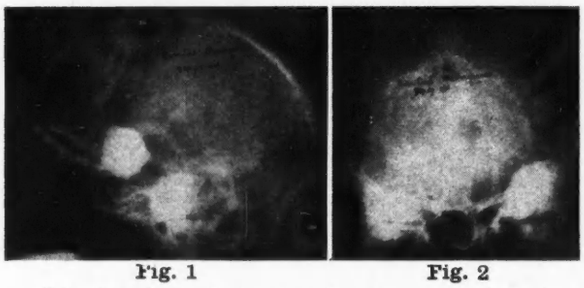


Fig. 1 Fig. 2

**Figs. 1 and 2.**—Lateral and antero-posterior views showing calcified meningioma.

Physical and laboratory examinations were within normal limits, with the exception of some degree of peripheral arteriosclerosis, plus physical signs of age. Her fundi were not considered to be pathologically significant.

Following admission she was, at times, rude, antagonistic, sarcastic and surly. She exhibited several organic signs, *viz.*, faulty recent memory, disordered judgment, disturbance in the emotional sphere, absence of insight. She also demonstrated an apparent exaggeration of previous undesirable personality traits.

The consensus was that she had cerebral arteriosclerosis and was, at that time, in a comparatively lucid interval. However, her case was by no means clear-cut. X-rays of the skull were taken. It was a surprise to be confronted with such positive etiological proof of the epileptiform seizures when the x-rays were read (see Figs. 1 and 2). Dr. H. H. Hepburn was consulted, and confirmed the radiological findings of a calcified mass in the right temporal region. Craniotomy was performed in Edmonton on January 28, 1949, and an intracranial tumour was found in the right temporal lobe—pathologically, a calcified meningioma. This was removed. Following the operation she was immediately

* From the Provincial Mental Hospital, Ponoka, Alberta. Published through the kind permission of Dr. T. C. Michie, Medical Superintendent.

put on small doses of anti-convulsants. She recuperated fairly well, considering her age, although, for some weeks afterwards she complained of generalized weakness, anorexia, neck pain, and she lost some weight. Gradually, however, she became symptom-free, and at the time of writing, has no complaints. She has been entirely seizure-free. Her physical condition has likewise greatly improved. Whereas, prior to the operation, hardly a day had gone by without some evidence of being ill-tempered, she has, since the operation, conducted herself in a satisfactory manner. Situations which previously evoked in her unfavourable reactions are now tolerated with relative equanimity. All who knew her before have remarked on the apparent favourable change in her level of adjustment. At the present time an attempt is being made to place her in a congenial private home.

SUMMARY

A case is presented of an elderly woman with a brain tumour, epileptiform seizures, and mental symptoms, whose pre-morbid personality traits were so accentuated that custodial care was finally necessary. Six months after craniotomy and removal of the tumour she continues to function well with only minimal evidence of behaviour disorder.

REFERENCE

1. WALSHE, F. M. R.: Diseases of the Nervous System, E. & W. Livingstone Ltd., Edinburgh, 5th ed., p. 69, 1947.

## INFANTILE CORTICAL HYPEROSTOSES (Caffey-Smyth Syndrome)

**Nathan Goluboff, M.D.**

*Saskatoon, Sask.*

INFANTILE cortical hyperostoses was first reported as a new clinical entity by Caffey of Babies Hospital, New York, in 1945, and he described ten such cases.[1, 2] Smyth[3] of San Francisco independently recognized and published a report on seven similar cases. Four other cases have been reported since.[4 to 6] Because the condition is but a newly, and as yet, rarely recognized entity, it is felt that the following case is worthy of publication and discussion.

A.M., a female infant of four and a half months of age, was first seen January 5, 1949. The history given by the parents was as follows: The infant had been well until about three weeks previously. She then became unusually irritable, whining a great deal and generally unhappy and cried on being picked up. At first they had attributed its condition to teething, but for the last week irritability had become very marked. A week previously, the right eyelids became swollen shut, but this completely improved by the next day. No redness was noted. For three to four days, swelling of the left side of jaw and face had been noted and this seemed mildly tender. On the day they brought the infant for examination, a small soft swelling was noticed on the back of the head. Salivation had recently been excessive. A slight pink itchy rash was present on the face and head for about a week. At no time did the parents think the infant was feverish. About a week before, a mild head cold had been present for a few days.

*Birth history.*—According to the parents, the prenatal and postnatal course, as well as labour, were normal. The mother had taken no special medication during pregnancy and had had no illnesses. She had been pregnant twice previously, and lost six month premature twins in 1941, and a seven month premature in 1942. Mother and father were both well. The infant had been on an evaporated milk formula, since soon after birth. No vitamin supplements, and no orange juice or other foods had been given.

*Family history.*—Not significant.

*Examination.*—The patient was a somewhat pale but normally developed and well nourished infant of four and a half months. Weight 15 lb. 11 oz. The left side of the face and jaw showed a diffuse non-hyperæmic swelling, poorly defined, and not obviously tender. It was more of a puffiness, rather than a definite mass. A small puffy swelling of about one inch in diameter was present on the back of the head in the right suboccipital region. Mouth and throat were normal. Lungs and

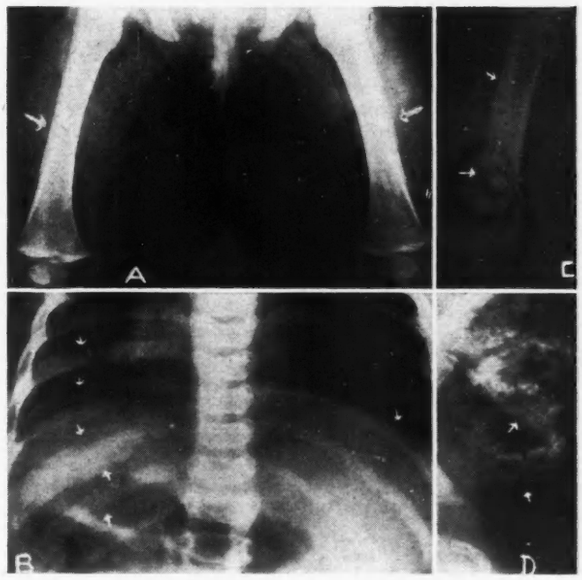



**Fig. 1.**—Roentgenograms, showing typical appearance of cortical hyperostoses of (A) femurs; (B) ribs, taken January 12, 1949; and (C) of the right femur; and (D) the mandible, seven weeks later. The left femur showed similar changes. The cortical changes in the mandible were present in the earlier x-rays, but are better demonstrated here.

heart were negative. The lower border of the liver was about one inch below the costal margin. The tip of the spleen was easily palpable. The extremities were negative. Rectal temperature was normal. Micro-sedimentation rate was 32 mm. in one hour. (Normal 1 to 10, with a column of blood 60 mm.) The impression was a possible vitamin deficiency or infantile cortical hyperostoses. Permission for further investigation was, at the time, refused by the parents. Abdec, 20 drops, and vitamin C, 50 mgm. daily was prescribed, plus addition of orange juice and other foods.

Less than a week later, the swelling of the face which had at first improved, again recurred on both sides. The mother also noted some swelling of the left thigh for the past day, and stated the infant was hardly moving the limb. She cried even more now, when held at the chest, on being lifted up. Both sides of the face, from the ears down, showed a puffy indefinite swelling, and gave the impression of a child with mumps. A definite deep induration was felt in the left thigh, on the anterior surface.

A complete x-ray survey of the skeleton was obtained, and the findings agreed with those described in previous reports on this condition. Cortical hyperostoses were demonstrated in both mandibles, shafts of the femurs, slightly in the shafts of the humeri, and markedly in the eighth to eleventh ribs, on the left side, posteriorly. No changes typical of scurvy or rickets were demonstrable.

On January 12, the parents permitted the child's admission to St. Paul's Hospital for two days. While in hospital the temperature remained normal.

*Laboratory findings.*—Hg. 66% (10.15 gm.), red blood cells 3,220,000, white blood cells 12,500. Differential: polymorphonuclears 64%, eosinophils 1%, monocytes 3%, lymphocytes 30%, disintegrated 2%. Blood calcium, 10.3 mgm. per 100 c.c., phosphorus 3 mgm. per 100 c.c., alkaline phosphatase, 44 King Armstrong units (normal 10 to 30 in infants), Kahn test negative, tuberculin test 0.1 mgm. old tuberculin, negative. Urine, negative. A vitamin C level was not obtained, but in view of findings in other cases, this would not have been especially significant.

On discharge from hospital on January 14, the following was prescribed: (1) Abdec, 20 drops; (2) ascorbic acid 100 mgm. daily; (3) phenobarb gr. ⅛ for restlessness; (4) elixir pyribenzamine, half teaspoon t.i.d. (approximately 2 mgm. per lb. of pyribenzamine). This was given as suggested by Caffey.

January 26. Seemed much happier. Moving limbs normally. Not crying as much on being lifted. Mild rash of face and lower abdomen present. Face and jaws were still about as puffy as they had been. The induration in left thigh was still palpable.

February 24. Child doing well, weight 16½ lb. Facial swellings vary. Parent states the child looks as though it has mumps one day, and is better a day or two later. The thigh induration was slight. Sedimentation rate still elevated to 25 mm. in one hour. Hgb. up to 88%. Pyribenzamine was discontinued and vitamin dosage decreased. Diet was now adequate. The parents were assured of an excellent prognosis, in view of the course in other cases reported.

X-rays of the skeleton were repeated March 2, 1949, and there was considerable improvement. There was still some periosteal layering in the left mandible and in the femora, but the new bone was merging into the cortex now. The previously affected ribs were larger than normal in calibre but appeared normal in texture.

*Discussion.*—The case presented is a very typical one, with almost all the features described by Caffey and Smyth in their reports. In reviewing the 22 cases so far reported, including the present case, the clinical findings have been as follows:

Age of onset: The onset was under seven months in eighteen. The other four cases had onsets up to two and a half years of age, and Caffey states that perhaps they are not fully acceptable as fitting into this group. The youngest case had an onset at three weeks. Sex was no factor.

Characteristic brawny, tender, non-hyperæmic facial, œdema-like swelling, was noted in all but two of the cases under seven months. Soft tissue swellings have been noted elsewhere. These, as well as facial swellings are variable, and may quickly improve and recur.

Irritability was very definitely noted in almost all cases.

Fever was present in all but three of the young infants, and has continued for as long as six months. In our case no fever was noted at any time.

Cortical involvement of the skeleton was present in all cases. This is an external thickening of the cortical portion of the bone, often laminated, and extends the entire length of the corticalis except for the terminal segments of the shaft. The bones involved included the mandible in all but one of the cases under seven months. The other common sites of involvement were clavicles, ribs, and extremities. The scapula was involved twice, and the skull in two cases. Changes in the metatarsals were found in two of the older infants. In our case, though a swelling was noted in the suboccipital area, and also an œdema of the eyelids on one side, skull involvement was not demonstrable. Eyelid œdema has been noted in one other case. In three of the first four cases reported by Caffey, the ribs were extensively involved and x-ray signs of pleural exudate were present. Only one other case has shown this, and in our case, despite fairly extensive rib involvement, no pleural abnormality could be seen. X-ray changes have been found where no soft tissue swellings were present, and in some cases the soft tissue swelling preceded x-ray changes in the underlying bones by several weeks. Scorbutic or rachitic changes were absent in all cases.

Biopsy of affected bones has been done in a few cases, and showed only hyperplasia of the lamellar cortical bone. Smyth reports detailed microscopic studies of the bone and surrounding soft tissue, which revealed degenerative changes of the muscle overlying the hyperostosis. This was of a fatty, fibrinous character. No evidence of inflammation or subperiosteal hæmorrhage was noted, except in the case reported by Dickson,[6] where he described invasion of the muscle by inflammatory cells.

*Laboratory findings.*—Tuberculin test was consistently negative, except in one case where it was considered unrelated to the cortical hyperostosis. Vitamin C levels have not been found to be of any significance. Serological examination of the blood for syphilis was negative in all cases. White blood cells, elevated in the majority, from 12,000 to 29,000. Anæmia not uncommon. Sedimentation rate, elevated in eight of the nine cases where it was recorded, and was markedly elevated in our case. Blood

calcium and phosphorus normal in every case. Alkaline phosphatase in many of the cases was definitely elevated and was the only abnormal findings of the blood chemistry.

*Diet.*—Vitamin supplements and dietary regimen were quite adequate in almost every case. Scurvy or rickets was never demonstrated. In our case, diet was obviously inadequate, and no vitamins were administered, except for that found in evaporated milk, but in view of the definite similarity to the other cases described, it is felt that lack of vitamin C was not a factor.

*Course and prognosis.*—In every case the course has been benign and self limited, but sometimes protracted from eight weeks to as long as nine months, making the care of the infant a difficult trial for both parent and physician. Several of the early cases reported, and now followed to five and six years of age, are completely normal, and show normal x-rays of the skeleton, except in one case, where there seemed to be some asymmetry of one side of the face, with thickening of the mandible on that side. A good prognosis can be definitely given, once the diagnosis is made.

The etiology is completely obscure. A number of other conditions may merit consideration in an individual case. Age of onset as a rule is earlier than expected in scurvy. Adequate vitamin C in diet, and lack of response to vitamin C administration, do not support the diagnosis. The bone changes found in scurvy, such as zone rarefaction beneath the epiphyseal line, the ground glass appearance of the shaft, and the Wimberger rings, are absent. Tuberculosis and syphilis have been excluded by tuberculin and Kahn tests. Infection as a causative factor is suggested by the usual presence of fever, and elevated sedimentation rate. Blood cultures and febrile agglutinins have been negative. There has been no response to penicillin or sulfonamides in a number of cases. Biopsy findings usually showed no signs of inflammation. Complete virus studies in five cases, as yet unreported, were negative. Neoplastic changes have been ruled out by biopsy and the course of the disease. Allergic reaction as a causative factor was considered by Caffey, who stated he would try antihistamine drugs in future cases. In the case presented, pyribenzamine in adequate dosage was used for six weeks. Though the infant definitely improved, swelling of the face kept recurring. In one other case where it was used, an antihistamine was felt to have no effect on the disease. Rheumatism and rheumatic fever may be considered in the older cases, and was the admission diagnosis in one case. Leukæmia may be suggested by the fever, bone pain, and in some cases fairly severe anæmia. Anterior poliomyelitis can be simulated by the bone pain and pseudoparalysis. Osteomyelitis of the mandible may be considered at the onset, as may epidemic parotitis, which was the admission diagnosis in one case. Chronic poisoning as a possible cause has been considered, but there has been nothing to substantiate this.

## SUMMARY

1. A case of infantile cortical hyperostoses, in an infant of four and a half months has been reported, with the typical findings of swellings of the face, and cortical hyperostoses of mandibles, femurs, humeri and ribs. Other of the common findings present, were marked irritability, elevated sedimentation rate and increased blood phosphatase.

2. The condition, as described in several previous reports, is reviewed. The etiology is unknown. The onset has been from three weeks to thirty months, with the majority at three to four months. The course has been from two to nine months, and the prognosis is invariably excellent, with complete recovery in all cases. No treatment of any specific value has been found.

I wish to thank Drs. A. B. MacDonell and E. W. Spencer for their assistance in the radiological investigation, and also Dr. J. L. Jackson, Professor of Anatomy, University of Saskatchewan, for his preparation of the x-ray photographs.

### REFERENCES

1. CAFFEY, J. AND SILVERMAN, W. A.: *Am. J. Roentgenol.*, **54**: 1, 1945.
2. CAFFEY, J.: *J. Pediat.*, **29**: 541, 1946.
3. SMYTH, F. S., POTTER, A. AND SILVERMAN, W. A.: *Am. J. Dis. Child.*, **71**: 333, 1946.
4. Conference on Infantile Cortical Hyperostoses: *J. Pediat.*, **32**: 441, 1948.
5. WHIPPLE, R. K.: *New England J. Med.*, **236**: 239, 1947.
6. DICKSON, D. D., LUCKEY, C. A. AND LOGON, N. H.: *J. Bone & Joint Surg.*, **29**: 224, 1947.

417 Birks Bldg.

---

There is no doubt that were the young taught to value the intangible things that make for abiding happiness, they would acquire a stimulus to good living and high thinking and they would be able to build up within themselves reserves on which they could draw in times of need, and particularly when their years were advancing. Those who have grown to maturity without a sense of values will find it difficult to acquire; but by experiment, experience and selection they may gradually be able to form new habits and to discover fresh ways of thinking.—Mervyn Archdall.

# TUBERCULOSIS MENINGITIS ARRESTED BY STREPTOMYCIN

**R. C. Browne, M.D. and R. J. G. Park, M.D., B.Sc.**

*Fort William, Ont.*

The patient, 3½ months old, was admitted to hospital on May 13, 1948, because of refusal of food and peculiar "fainting spells" the previous three days.

Labour had been of 12 hours' duration, not difficult, and delivery was by low forceps. The baby, a male, weighed 6 lb. 5 oz., cried spontaneously and was in good condition. It had very large bilateral inguinal herniæ, and there was some difficulty in finding a suitable formula, so that he had not gained properly. There had been no fever or cough, but had some vomiting for a few days before admission.

Examination on admission revealed a rather thin baby, weighing 10¼ lb. The head seemed a little large in proportion to the body, the fontanelle was full but not tense or too large; the reflexes were all a little hyperactive, and there was some resistance to flexion of the back but no rigidity. There were no other abnormal physical findings (except the herniæ) and no fever.

White blood cells were 40,000, with 86% polymorphonuclears. A lumbar puncture was done. The fluid was not under definitely increased pressure and showed 180 cells, mostly lymphocytes, Pandy test two plus, sugar absent, and on standing formed a web which had an appearance typical of tuberculous meningitis. An intradermal tuberculin to our surprise (because of the child's age) was markedly positive. X-ray of the chest showed a shadow of the right upper lobe which we considered typical of primary tuberculous infection.

We could not at that time find any source of contact with tuberculosis, but later traced it to a student nurse who was in the newborn nursery at the time the child was delivered, who shortly afterwards was admitted to sanatorium with open tuberculosis.

Repeated lumbar punctures were done, and May 25 the web from the cerebrospinal fluid showed tubercle bacilli on direct smear.

May 18 streptomycin therapy was begun—¼ gram intramuscularly b.i.d., and lumbar punctures were done every day or two. May 31 streptomycin intrathecally was started also, 50 mgm. daily. The cerebrospinal fluid findings were relatively unchanged—cells between 100 and 200, sugar absent or a trace, chlorides 630 to 660, and Pandy one to two plus—until June 13 when the cell count rose abruptly to 550 and there were many red blood cells in the fluid (not traumatic), and the child showed more clinical signs of meningeal irritation. We considered this to be due to the streptomycin, so the intrathecal dosage was given every second day for eight days, then daily again till June 30. At that time the cell count was regularly under 100, the chlorides over 700, sugar present, and Pandy test still positive but not marked; so the intrathecal streptomycin was stopped.

The intramuscular streptomycin was reduced to one-eighth gram b.i.d. July 6, then to one-sixteenth gram July 10. The child was discharged home in care of the mother (a very sensible R.N.) July 18.

During all the hospital stay and for a short time afterwards the baby was very irritable, fed very poorly and vomited part of the feeding two or three times daily, especially if forced; and the weight stayed between 9½ and 10 lb. Shortly after going home he began to feed much better, became much less irritable and brought up very little, and the weight showed a steady increase, so that he weighed 15 pounds in the middle of January.

There was considerable trouble with many of the solids, which seemed to cause bad cramps, but it was found later that most of this trouble was due to the large left hernia being down—it could not be controlled satisfactorily by any form of truss. The mother found that if the hernia were kept reduced for an hour or so after feeding there was very little trouble with colic.

After discharge from hospital the cerebrospinal fluid was examined every two weeks at first, then every three to four weeks. The findings all improved gradually till they reached normal levels for cells, sugar, chlorides, and colloidal gold curve the first week in September, although there was a slight increase in protein till January. The intramuscular streptomycin was continued at one sixteenth gram twice daily till September 10 then stopped. (There was a marked urticarial rash at this time which disappeared three days later.)

October 22 x-ray showed marked increase in density of the shadow in the right upper lung. Streptomycin was started again intramuscularly, one-sixteenth gram daily; increased to one-eighth gram from November 13 to 27 as there was no recurrence of the urticaria, then reduced to one-sixteenth gram daily again and continued at that dosage till December 17, when it was discontinued altogether.

November 19 the density of the x-ray shadow was much less, and there has been slight further improvement since then.

When last seen March 25, of last year the child looked and acted normally in all respects except for his hernia. He weighed 20 pounds, could pull himself upright and stand with support, and showed no signs of hydrocephalus or of nerve damage. The cerebro-spinal fluid findings then were all normal except for a very slight increase in protein.

The family has moved to another town lately, but the mother reports that the child still acts normally and continues to gain and develop physically—one year from the onset of his illness.

Sear Bldg.

# SPECIAL ARTICLE

## The Problem of Refugee Doctors

Among the many problems arising out of the war that of the Refugee Physician in Canada is one which has required the most careful and sympathetic consideration. A recent account by the Registrar of the College of Physicians and Surgeons of Ontario and its Chairman of the Committee on Education and Registration showing how the matter is dealt with in that Province is of great interest.

The problem has many aspects. Language difficulties of course are frequently encountered; obviously a working knowledge of English is a necessity. Even such a comparatively small matter as the unusual spellings of the names of applicants constitutes a difficulty. For identification purposes, the names of the applicants must be exactly similar to those appearing on their official birth certificates or diplomas, etc.

The most important problem is the investigation of the credentials of applicants. It has to be remembered that Germany and many other European universities of high standing suffered very severely in efficiency from the earliest days of the Hitler régime. All members of the staff either of anti-Nazi sympathies or of Semitic extraction were driven out, with consequent great weakening of the teaching power and the mere fact that a diploma was obtained from what formerly was an accepted teaching centre does not always mean very much. On the other hand there is very little information available as to the present standing of the various mid-European universities and medical colleges.

To help solve this difficulty all such candidates for an enabling certificate are required to make a personal appearance before a Joint Committee of the College consisting of the Executive Committee and Education and Registration Committee. At this personal interview, to which all the candidates willingly come, an attempt is made by the Joint Committee to arrive at a fair and satisfactory evaluation of their knowledge of the English or French language, of their professional training, and of their fitness to practise medicine. After the applicant has retired the Committee carefully considers the information gained from the interview and, after reviewing all the available documentary evidence concerning the preliminary and medical education of the candidate decides whether at this time he should or should not be granted an enabling certificate.

This procedure has been found to give the Committee much more complete knowledge on which to evaluate any claims for an enabling certificate, which, if granted, would allow him to write on the examinations of the Medical Council of Canada, which is the only port of entry for our own Canadian university graduates, British or refugee physicians alike, who wish to practice in Ontario.

These are some of the difficulties faced by the Committee, and there is no doubt that each physician receives most sympathetic and painstaking consideration. So far as language difficulties are concerned applicants are always helped out as much as possible. If they are unable to make themselves reasonably well understood they are advised to take time to acquire some speaking knowledge of English and then apply again. Frequently an applicant is advised to obtain an internship in a hospital to improve both his language capacity and his professional knowledge.

It is very evident that most careful and laborious methods are being followed in dealing with a formidable problem. There has been a great deal of criticism of the Canadian medical profession from time to time for its attitude towards displaced physicians. Only those who take an active part in solving the problem realize exactly what complexities it presents. Their sympathy in dealing with the applicants is worthy of high praise. Their sincere desire to help them cannot be questioned.

## Ten Ways to Kill an Association

1. Don't come to the meetings.
2. If you do, come late.
3. If the weather doesn't suit you, don't think of coming.
4. If you do not attend a meeting, find fault with the officers and members.
5. Never accept an office, as it is easier to criticize than do things.
6. Nevertheless, get annoyed if you are not appointed to a committee. If you are appointed, don't attend the committee meetings.
7. If asked by the Chairman to give your opinion regarding some important matter, tell him you have nothing to say. After the meeting, tell everyone how things should have been done.
8. Do nothing more than is absolutely necessary. When other members roll up their sleeves and unselfishly use their ability to help things along, howl that the Association is run by a "clique".
9. Hold back your dues as long as possible—better still, don't pay at all.
10. Don't bother about getting new members, but if you do, be sure they are grouches like yourself. —Age Publications Ltd., Toronto.

---

I am at a loss to know whether it be my hare's foot which is my preservation, or my taking of a pill of turpentine every morning.—Samuel Pepys.

**THE CANADIAN MEDICAL ASSOCIATION**

**Editorial Offices—3640 University Street, Montreal**

*(Information regarding contributions and advertising will be found on the second page following the reading material.)*

# EDITORIAL

## THE SWIFT CURRENT HEALTH REGION EXPERIMENT

THE present issue contains an account of the status of a scheme for supplying medical services in the Swift Current region of Saskatchewan. This scheme was started more than three years ago. The area was a clearly delimited one, and the experiment of providing health services for its population by means of local taxation was watched with great interest.

At first there were high hopes of success. Physicians were attracted to the area by the reasonable returns and some apparent degree of security, and the amount raised by taxation enabled the work to be carried on. Now, however, inexorable economic stresses are making themselves felt. The demand for medical services has increased, with of course correspondingly higher costs. Taxation is the only source from which these can be met. But the people of the area will permit no increase in this particular tax. To add to the difficulties, there has been a crop failure this year, so that even the original tax may not be collected. The local authorities tried to obtain an increase in the budget, but failed on account of the taxation difficulty. The best that could be done was to carry on with the same budget as of 1949. The doctors are therefore in the painfully familiar position of having to do more work without a corresponding increase in remuneration. They are denied even the very reasonable compromise of arranging delayed or part payment on account until things improve, an arrangement which they have had to put up with in other years.

Unfortunately, also, the conditions under which medical care is dispensed in this area have made it more and more difficult for the local physicians to refer special cases to outside centres. Even with the best intentions, therefore, deterioration of the service must occur.

The plan is a sincere effort to solve a medico-economic problem. But, as Dr. Ferguson points out, it has an inherent weakness: no part of the country can be regarded as entirely isolated where health services are concerned. There must be a spreading of the costs on a wider basis, which means provincial and federal participation, especially in such areas as the Swift Current district. Circumstances have fully justified Dr. Arthur Kelly's opinion in 1948,* that "plans of this type should be so broadly based as to minimize the effects of local variations in prosperity."

# EDITORIAL COMMENTS

## The Bulletin on Narcotics

In spite of the large volume of periodic medical literature it is felt that a particular aspect of medical science can best be reported in a special journal. Such is the case with the *Bulletin on Narcotics*, a new periodical publication of the United Nations, which is prepared by the Division of Narcotic Drugs, Department of Social Affairs of the United Nations Secretriat. The first number appeared in October, 1949, and beginning in 1950, the *Bulletin* will be issued four times a year. Separate English and French editions will be published and summaries of important articles will be available in Chinese, Russian and Spanish.

The international control of narcotic drugs and the struggle against their illegal and harmful use is of the greatest importance to many groups in all parts of the world. The twentieth century has seen great advances made in the establishment of effective control of narcotics and the United Nations has inherited from the League of Nations the duty of enforcing the highly complex legislation in this field.

The *Bulletin on Narcotics* is designed to present current reports on the control of narcotics. It will contain technical and scientific studies on narcotic drugs and articles on legislation and administration in various countries, as well as a bibliography listing current books and articles on these subjects. The *Bulletin* will also contain accounts of the preparatory work which is being undertaken with a view to establishing a single Convention designed to replace the existing eight international instruments on narcotic drugs and to strengthen and simplify the international control machinery.

The first issue of the *Bulletin on Narcotics* contains a series of illustrated articles on such subjects as Opium Production Throughout the World; The Commission of Inquiry on the Coca Leaf; Determining the Origin of Opium; a Report on the Fourth Session of the Commission on Narcotic Drugs; a Review of the recent

* The Swift Current Experiment, *Canad. M. A. J.*, **58**: 506, 1948.

actions of the Economic and Social Council in this field and a calendar of the meetings of international organs concerned with the control of narcotics.

### Provision for Mental Care in Quebec

Thirty years ago a paper was published in this Journal by the late Dr. G. S. Mundie, in which he deplored the backward state in the Province of Quebec of planning for the handling of the mentally defective. Efforts certainly were being made, and the name of Professor Carrie Derick will always be recalled for her active interest in the subject. But little more was done at that period than make very necessary surveys to find out the extent of the problem: there was practically no planning to deal with it.

In the intervening 30 years, what has been done to meet the situation? What might strike the attention most forcibly of those who pioneered so earnestly in this cause would be the extent to which the facilities for dealing with the mentally defective have become inadequate. Protests have now come, not from the medical side, although these have not been lacking, but from a Montreal Police Director who reports a peculiarly acute state of over-crowding in city police stations due to the emergency housing of the mentally ill. The demand for adequate accommodation has indeed gone far beyond the available space. And of course the crowding itself is not the only undesirable feature, bad as it is. The mental hospitals themselves are so clogged with cases needing permanent care as well as others merely custodial, that they are unable to undertake the curative and preventive work of which modern psychiatry is capable. We understand that steps are being taken to build new institutions for mentally deficient children, but the needs are greater than planned for, and progress is lamentably slow.

### The Writing of Papers

Generally speaking, short papers are harder to write than long ones. It takes more trouble to prevent oneself from using unnecessary words. Obviously, it is easier to say everything that comes into the mind than it is to examine everything before selecting it. But is such selection worth the trouble? It certainly is from the point of view of the reader. The author's very natural difficulty is to stand away and look at his own writing. He should remember, however, that, other things being equal, short papers are more likely to be read than long ones, in fact, even if they are not equal; that as with the preaching of a sermon, it is in the first 15 minutes that souls are saved; that space for printing is scarce and expensive. Long papers are not necessarily refused, but length is a handicap that only the best entries can overcome. A good average for an article is about 3,500 words.

## MEDICAL ECONOMICS

### THE SWIFT CURRENT HEALTH REGION

**G. Gordon Ferguson, M.D.**

*Registrar, College of Physicians and Surgeons of Saskatchewan, Saskatoon, Sask.*

The medical service plan in Health Region No. 1 of Saskatchewan has now been operating for more than three years, and the difficulties that have shown up seem to be pyramiding rather than subsiding. It is appropriate to examine some of these difficulties in an effort to find their cause and to suggest some way of avoiding their recurrence. This is especially important should a health region be developed in some other part of the province.

In the beginning, the work in the region began smoothly and to the satisfaction of both residents and physicians. As far as the residents were concerned their sources of medical care, their freedom of choice of physician, and all aspects to which they had previously been accustomed were unchanged. It was made easier for them to consult a physician, and the absence of any monetary consideration at the time of consultation seemed to help. Without doubt there was some irresponsible seeking of service, as well as shopping from one physician to another. This irresponsibility on the part of some residents has been noted, but it did not occur on a large scale. Unfortunately it only takes a small number to create a big splash and to considerably waste the substance of the rest of the region.

Although this was the position in the beginning, it was found necessary owing to the restricted financial policies of the region to be more rigid in the selection of referrals to specialists and physicians beyond the region. In this way the freedom of the recipient to seek a physician or surgeon of choice has been definitely restricted. This restriction has increased with each year that the scheme has operated. It is rather distressing today to see the final close restriction allowing benefit only for selected surgical procedures which it is felt absolutely cannot be done in the region. It has always been the policy pointing to good medicine that the patient should be free to select his physician wherever that may be.

An adequate medical service cannot be based on a small area. A medical service for the people of Saskatchewan no matter where they reside, is primarily a provincial service, but even that is backed up by certain extra special service to be obtained only in the larger cities. Unless the plan of an adequate service is kept on a wide base the service tends to become restricted and to deteriorate.

#### Effect on Physicians

The difficulties of the region are clearly reflected among the physicians at the present time. In the beginning, a fee was set by which

they received payment on service-rendered basis. There was a great demand for more work and more physicians came to the region. The apparent increase in numbers of physicians requires careful analysis because in 1946 the whole province was under-served, owing to many men being still retained in the forces. There has, however, been a greater increase in the Swift Current region than in the province generally, and this has been due to the fact that there was work to be done and there was some guarantee of security to the physician.

After two years it became apparent that the demands for work were not slackening from the people. It also became apparent that they desired to pay only a certain amount of money for the service by way of taxation. After two years, therefore, in order to stabilize the plan, the physicians were asked to accept a controlled budget with certain safeguards, *viz.*, that should the work continue to increase, the budget would rise accordingly each year, based on the experience of the preceding year.

On the surface this seemed fair but in practice it has been a boomerang. The Region Executive in conference with the physicians agreed that for 1950 the budget should be increased by $36,000. However, when the Region Executive reported to the Region Health Council, the Council refused to increase the tax to raise the extra amount. The doctors were then advised that the Regional Council had not approved the action of its Executive and they were asked to do the work for the 1949 budget. The region was having a crop failure and normal taxes would not be collected.

The physicians would put up with payment on account and delayed payment to help the Region, but as things stand now they not only accept this, but also lose all hope of recovery when conditions improve.

The result has been that the physician no longer feels the security he would have had if the plan had continued as it started. He finds himself each year in a turmoil of discussion and debate about budget and cost, and he notices his net income decreasing even though he is probably one of the hardest worked servants of the community. There will be continued unrest in the region until the present system is corrected and there will be a movement of physicians from the region, which will be to the disadvantage of the people.

### WHY IS THE PLAN NOT PROGRESSING?

Probably the greatest reason for this deterioration of a plan so well begun has been in the financing. This has been abetted by a continued refusal to recognize one basic principle. This principle is that a complete medical service is a provincial and Dominion concern. It has recently been stated by the Premier that no provincial plan can be considered until it has been worked out from a Dominion level, in which case it is expected that 60% of the cost may come from the Dominion and the balance from the province and individual. It is expected that the individual contribution would not exceed $10.00 per person per year. At the present time, in Swift Current, the individual is paying 85% of the cost, since the provincial government, through grants, only assists to the extent of 15%, and the Dominion not at all.

This is a heavy personal contribution. It has led the people to regard payment for the service as a burdensome tax, and they endeavour to confine the cost of the service to their ability or desire to tax themselves.

A comparison may be made with the Saskatchewan Hospital Service Plan, where taxes are collected to the extent that seems to be feasible and are supplemented by an unknown payment from the provincial treasury. It is realized that if this fluctuating payment does not back the scheme, the hospitals, being institutions, will cease to function. However, under the "ceiling principle" it has been assumed that the physicians, being human and not machines, will not cease to function no matter how inadequately recompensed. It is felt by the physicians in the region that the assumption by them of the financial risk of the scheme is not fair. I would say the physicians are now very restless.

The argument has often been advanced that the economic position of a physician goes up and down with that of the district in which he lives. This is true, but the people in the district in bad years assumed obligations even though they were unable to pay for them at the time. Then, in better years the old obligations were met and the physician had the opportunity of recovering some of his previous loss. The present situation in the Region leaves the physician in the depressed position without hope of recovering his losses. Experience elsewhere has shown that this depressed position will continue unless they continually *fight* for improvement. In Health Regions and other contract work the doctors should have their future position assured before they accept these depressed conditions.

## MEDICO-LEGAL

### MEDICO-LEGAL COMMENTS*

PART I.

**T. L. Fisher, M.D.**

*Ottawa, Ont.*

Perhaps the place to start in any talk about protection against medico-legal troubles is with the license to practise. Equally, perhaps,

* Prepared for the Interns and Final Year Medical Students at the Ottawa Civic Hospital.

it is not necessary to say what the license allows beyond the simple statement that it is the concrete legal evidence of capacity to practise medicine, that it allows a doctor to practise and to charge for the work done.

More pertinent to this discussion is some consideration of the things demanded of doctors to whom a license is issued. Having said that, let us consider it in reverse in one particular. The law does not demand of doctors that they see any and every patient who requests their services. Forgetting for the moment anything but the purely legal aspect, a doctor may refuse to see any patient for whose care he has not already made himself responsible. That is, an individual may state his need to a doctor and the doctor may say that he can not or does not choose to attend the individual and no penalty will be required of him. There are, of course, other non-legal considerations which should influence doctors, the need of the individual and the availability of other doctors, to mention only two.

The case is wholly different, though, when once a doctor has accepted responsibility for the care of a patient during an illness. Then the responsibility is wholly on his own shoulders to provide the patient with everything that may properly be expected of a doctor under the circumstances. If he refuses to make a call, for example, and something untoward happens the onus will be on the doctor to show that it could not have been prevented even had he responded. This holds in all cases. The doctor's responsibility is in no way changed whether the patient proposes to pay the doctor, whether the doctor receives payment or does not, or whether the case is known to be a public case from the beginning. When once responsibility for the care of a patient has been accepted it remains until the illness ends, unless one of two things occurs. The patient may discharge the doctor, when the responsibility ends. Or, similarly, the doctor may state that he wishes to be relieved of his responsibility and may leave the case after making satisfactory and adequate arrangements for the future care of the patient.

The various applications of this statement will be obvious. The public patient discharged from hospital for example, if that discharge was made only when the need for hospital care no longer existed, can not hold the attending physician responsible after his discharge; or if more medical care be necessary, when the patient's own doctor outside the hospital has been informed of the patient's hospital course. Too many doctors forget that obligation. On the other hand, the doctor in a remote district is in a somewhat different situation. Probably there is no other doctor to whom he can transfer the patient and, no matter how unpleasant the case, he cannot discharge himself and perhaps must not allow himself to be discharged by the patient. When once he has accepted the load he is, by circumstances, forced to carry it to the end.

This, then, leads to consideration of the kind and quality of the care a doctor, legally, may be expected to give. Generally, this may be stated to include the possession of reasonable knowledge, the use of reasonable care in arriving at a diagnosis and the use of reasonable skill in applying treatment. Because the word "reasonable" in this context is used legally with some preciseness we need to know its meaning. By "reasonable" knowledge, care or skill is meant that degree or extent of knowledge, care or skill possessed by other men doing the same type of work under the same general circumstances.

It is worth while to devote a few minutes to a consideration of the implications of this definition. It will be obvious at once that the law allows a doctor to choose his own level of comparison, or, in other words, to write his own ticket and set his own price. The doctor may decide that by virtue of knowledge, training and experience he is a general practitioner, or a specialist, and if trouble arises he will be judged by the standards of other men doing the same kind of work which he claims to be able to do. He must live up to the claims he has made for himself. For example, if a general practitioner gets into trouble, the extent of knowledge possessed by other general practitioners, the degree of care and the amount of skill exhibited by them will form the basis of comparison. He will not be expected to possess the knowledge or the skill of a specialist devoting his whole time to the one kind of work. If, on the other hand, the doctor holds himself out as a specialist a different set of values will be the basis of judgment. In either instance other doctors will be called by the court and asked whether, in any given case, they would consider the knowledge adequate, the care and skill sufficient, had such a case been under their care. On the basis of the evidence given the court, applied to the case in question, a decision will be given. In terms of his own claims, the doctor will not be expected to have done the best possible work. One judgment much quoted puts it:

> "Every person who enters into a learned profession undertakes to bring to the exercise of it a reasonable degree of care and skill. He does not undertake, if he is an attorney, that at all events you shall gain your case, nor does a surgeon undertake that he will perform a cure; nor does he undertake to use the highest possible degree of skill. There may be persons who have higher education and greater advantages than he has, but he undertakes to bring a fair, reasonable and competent degree of skill."

## PROTECTION AGAINST CHARGES

Before considering the things a doctor may do to protect himself against charges of negligence or malpractice it probably is wise to con-

sider who may bring action against a doctor. The answer is easy—anyone who feels he has a grievance, whether, in the event, it proves well-founded or groundless. Only a small proportion of legal actions against doctors are nuisance suits, but such suits occur and all doctors are liable to them; the patient, for example, who, to satisfy a personal grudge is willing on any flimsy pretext to make the doctor defend himself. And, once the matter has gone to court, defend himself the doctor must, if he wishes to avoid some penalty.

Knowing then that anyone who wishes may bring action against a doctor it is time to consider how the forehanded doctor can lessen the likelihood of such an action. Remembering that not all patients can be satisfied with the best of good work, and considering them as an exception, it is fair to state that reasonably good work on the part of any doctor in his own chosen and stated field is his best protection. This statement allows a more detailed consideration of the things to be done so that, in the case of trouble, the reasonably good work can be demonstrated to the satisfaction of a court.

There is no need to do more than mention what has already been said, that the doctor must be able to demonstrate reasonable knowledge; his previous training in terms of his claims for himself will help, the fact that he goes away periodically for postgraduate study, and his standing in the profession as shown by things like his hospital appointments, also help. To demonstrate that the reasonable knowledge was applied with reasonable care and skill a number of other things must be considered.

The doctor should have offered his patient a fair explanation of his findings, the conclusions he drew from them and the use he proposes to make of them in applying treatment, as well as the general character of the treatment. The explanation, it should be obvious, should be suited to the mentality of the patient. Not all patients have the knowledge or ability to follow even a simple exposition of a scientific fact. In parenthesis, with this in mind do not be too readily amused at the obviously foolish things reported to have been said by a patient's previous doctor. He may have oversimplified the matter in an effort to explain to the patient, who, in turn, may have misunderstood and misquoted him to you. Nor should you become too angry when your own best efforts at explanation get back to you as inane remarks, told with all seriousness. These things work both ways.

Surgical means of treatment perhaps should not, but in actual practice do require special consideration. With surgery there is a deliberate and immediate effort to change body function or to remove part of the body. Explanations here should be particularly clear and should include not only what can be forecast as a necessity, but what might have to be done if conditions are encountered other than those diagnosed but quite within the realms of possibility. As an example, the woman with uterine bleeding should be told not only what is known to be necessary, but should be warned that if malignancy is found more extensive surgery will be done. Such explanations never should be so detailed as to confuse the patient and never so scanty as to mislead. It was perhaps said best by Mr. Justice Hodgins:

> "The relationship between the defendant and the plaintiff was that of surgeon and patient, and as such the duty cast upon the surgeon was to deal honestly with the patient as the necessity, character and importance of the operation and its probable consequences and whether success might reasonably be expected to ameliorate or remove the trouble, but that such duty does not extend to warning the patient of the dangers incident to, or possible in, any operation, nor to details calculated to frighten or distress the patient."

The question of permission for proposed examinations and treatment follows naturally on the explanation. The mere fact that a patient consults a doctor with reference to illness allows the doctor to presume permission for the usual forms of examination. For other and more involved examinations, however, permission should not be presumed but should be obtained specifically after adequate explanation. One instance in which the simple presence of the patient in the doctor's office should not be assumed to carry permission for examination or treatment is where the patient is sent by someone else, most often when an employee is sent by an employer. That person may not want that doctor, may resent the examination, may not wish treatment and if anything goes wrong may try to hold the doctor responsible on the grounds that permission was not given. Here it pays to enquire whether the patient wishes the employer's instructions to be followed.

As with the explanation before surgery so with permission for it, special consideration is necessary. Because surgery may mean loss of life, irreversible changes in the patient's body or loss of some part of the body, the permission should always be signed, dated and witnessed. Even then it is possible for patients to state they did not understand what they were signing and if there are reasonable grounds for believing the claim the courts may hold the signed permission to have been insufficient. So permission must be preceded by an explanation that is explanatory for that patient, under circumstances such that the patient can never claim he gave permission without understanding.

The only place where doctors are free to proceed with treatment, medical or surgical, without permission, is where the patient is unable, because of illness or injury, to give such permission but where delay might result in death or irre-

parable damage. Then, and only then, may the doctor proceed to do what, in his judgment, is necessary for the patient's good. Indeed, if in these circumstances he failed to give necessary treatment because no permission could be obtained, he might easily be found guilty of malpractice or negligence. Just as soon as the patient's recovery allows it an explanation of the treatment given and that proposed in the future should be made so that the patient may regain his right of decision. "No amount of professional skill can justify the substitution of the will of the surgeon for that of his patient." (Bennan vs. Parsonnett, 1923, 83 N.J.L.R. 20 at p. 26.)

Remember too, that many examinations and forms of treatment for minors require permission of the parents or guardians; intravenous work, bronchoscopic examinations and pelvic examinations come quickly to mind as examples.

That this discussion of the question of permission for treatment does not exhaust the subject will be obvious, but it may provide a foundation from which more involved questions can be decided properly.

*(To be continued)*

# ASSOCIATION NOTES

## THE ANNUAL MEETING

**Place: Halifax, Nova Scotia**

**Time: June 19 to 23, 1950**

Have you made your reservations yet? It is important to do so EARLY. Your co-operation in this matter will greatly aid the Housing Committee in getting you comfortably settled. There will not be hotel accommodation for all, but there will be room for everybody who plans to attend. The local committee will do all in its power to see that you and any others in your party are well cared for. Of necessity those engaged in the executive aspects of the meeting must be accommodated at headquarters or as near them as possible, and as a matter of courtesy the same will apply to our guests. Apart from this, space will be allocated with the wishes of the member constantly in mind.

Few who attend the annual meeting and travel from a distance wish to leave without enlarging their knowledge of the city visited and the province in which it is situated. When seeking

**The New Victoria General Hospital, owned and operated by the Province of Nova Scotia and the central teaching hospital unit of Dalhousie's Medical School, in Nova Scotia.**

this information their first thought is of the sources of medical education there and facilities for practice. In both regards Halifax is singularly blessed. The first planning of the city left a large Common on which a series of humane institutions were built beginning nearly a century ago. The teaching of medicine was initiated at Dalhousie University in 1868. In 1873 it suspended its School of Medicine and the Halifax Medical College came into being, erecting a building on the Common in close proximity to the Provincial and City Hospital and the Poor Asylum. In 1887 Dalhousie also secured building space in this area. In 1911 the Halifax Medical College fused its interests with Dalhousie University which has since continued its faculty of medicine. It was accepted as a grade A school by the American Medical Association in 1923 and has continuously held that privilege since. Of late years it has restricted applica-

## APPLICATION FOR ACCOMMODATION
## C.M.A. MEETING, HALIFAX, JUNE 19 TO 23, 1950

Dr. C. M. Jones,
Halifax Infirmary,
Halifax, Nova Scotia.

Please reserve the following:
(Indicate a first, second, and third choice).

Room(s) for ..... person(s) in .....

1. Hotel with private bath.
2. Hotel without private bath but running water in rooms.
3. Tourist Home — First Class accommodation.
4. Tourist Cabins, private bath. Outskirts of city. Bus transportation.
5. College Residences.
6. Private Home. Selected after inspection.

Will you notify committee if you cancel a reservation or secure accommodation with friends? .....

Any special request .....
.....
.....

Arriving Halifax ..... at ..... a.m.
(Date) (Hour) p.m.

Leaving .....

Means of Tranportation: Rail ..... Car ..... Plane .....
(NOTE: You will receive confirmation direct from the committee accepting the reservation when made.)

Are you willing to share a double room with another member of the Association? .....

Room(s) will be occupied by:

| Name | Address | City | Province |
|---|---|---|---|
| ..... | | | |
| ..... | | | |
| ..... | | | |
| ..... | | | |
| ..... | | | |

(If children, please state age)

This application is submitted by me as:

(*a*) Member of Executive Committee.
(*b*) Delegate to General Council.
(*c*) Participant in Scientific Program.

Please send confirmation to:

Dr. .....
(Please print)
.....
.....

tions for admission to bona fide residents of New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland.

In 1887 the Provincial and City Hospital was taken over entirely by the Province of Nova Scotia to become the Victoria General Hospital. A magnificent new unit has recently been added to this institution. Construction will be continued to a minimum capacity of six hundred beds. A nurses' residence with accommodation for four hundred is now under construction. With the exception of obstetrics, pædiatrics, and infectious and contagious diseases, this hospital provides a complete service, both indoor and outdoor. In its immediate vicinity are the Provincial Pathological Institute, the Children's Hospital, the Halifax City Tuberculosis Hospital, the City Infectious Diseases Hospital, the City Home, the Grace Maternity Hospital and the Dalhousie Public Health Clinic. About five hundred yards north of this group is Camp Hill Hospital administered by the Department of Veteran's Affairs. All of these fine hospitals are integral parts of the teaching of medicine at Dalhousie. During the meeting you will have an opportunity to visit all these institutions and observe an aggregation of interests devoted to prevention, teaching, and treatment of disease quite unique in Canada.

---

## THE WORLD MEDICAL ASSOCIATION

**W. Magner, M.D.**

*Toronto, Ont.*

[*We published a summary of the third annual meeting of the World Medical Association in our January issue. The following additional comments by Dr. Wm. Magner are worthy of note.*—EDITOR.]

We must recognize that the title, World Medical Association, is a misnomer, expressing only a pious hope. The medical profession of Germany, Japan, Russia, and the countries dominated by Russia, is not represented in the W.M.A., and while it is probable that an association of German doctors will be with us before long, it is unlikely that the profession in the U.S.S.R. or its satellite countries will qualify for membership in the foreseeable future.

There are three questions which I will attempt to answer. What has the W.M.A. accomplished in the three years of its existence? What may the W.M.A. accomplish in the future? Is the W.M.A. worth while?

The W.M.A. has adopted a code of ethics, for the guidance of doctors throughout the world. It has collected a great store of information dealing with social security measures in twenty-four countries, and it has adopted sound principles which should guide national medical associations when they are confronted with governmental proposals for the medical care of the people. The W.M.A. has made a detailed study of the facilities for medical education in thirty-two countries, and has recommended that national medical associations should arrange an exchange of information regarding opportunities for graduate and postgraduate training. The W.M.A. has established friendly relations with the World Health Organization, with Unesco, and with other international bodies which are interested in medical science and medical care, and has made clear to these bodies its opinion that all matters dealing with medical practice, medical ethics and medical education should be referred to the World Medical Association. The W.M.A. publishes a Bulletin, in which full details of its activities are recorded in three languages. The W.M.A. is doing something to promote friendship, respect, and understanding among the doctors of the world. These, I think, are the chief accomplishments of the World Medical Association.

What of the future? The W.M.A. proposes to continue its present studies, and to undertake others, dealing with hospitals, with medical man power and the economic position of doctors, with pharmaceutical practices, and with medical libraries. It proposes to co-operate fully with W.H.O., Unesco, and other governmental bodies interested in medical affairs, while, at the same time, doing its best to ensure that none of the activities or decisions of these bodies is adverse to the interests of the medical profession. It proposes to do what it can to assist doctors from medically backward countries to obtain advanced training in the great medical centres.

Is all this worth while? My own answer is "yes", but I would qualify the affirmative. I do not believe that the W.M.A. will accomplish much of great value—I believe, indeed, that the Association will fail entirely in its main objectives—unless it has the active support of its member Associations. It is not sufficient for us to subscribe to the W.M.A., and to send delegates to its assemblies. We must spread information about its activities; and we must support its policies. There is little use in the W.M.A. concerning itself with medical training and international standards of medical practice, if the medical schools and teaching hospitals in the United States, in Great Britain, and in Canada, do not agree to open their doors more widely to graduates from such countries as India and China, where there is a desperate shortage of well-trained doctors. There is little use in the W.M.A. promulgating principles governing the attitude of the medical profession towards governmental plans for health insurance, unless each national medical association agrees with these principles, and stands fast for them when the time of trial comes. There is little use in the W.M.A. adopting a code of ethics, if the code is not taught steadily and insistently in the medical schools in all countries. The W.M.A. will fail in its attempt to promote friendship and co-operation between the doctors of the

world, if we hold to the old proverb that charity begins at home, or if we believe that we can keep our own house in order when surrounding buildings are crumbling.

If the W.M.A. can enlist the interest and active support of the councils of the great national medical associations, and of the governing bodies of the great medical schools and teaching hospitals in all countries, it may accomplish much of lasting benefit for the medical profession and the people of the world. Without such interest and support, the World Medical Association will fail. The issue is in the balance. After three years little is known of the W.M.A. by the rank and file of the medical profession, and little or no interest in it has been shown by the medical authorities of universities and hospitals—this is certainly true of Canada, and I think it is true of England and the United States of America. It is encouraging that the W.M.A. has set up a Committee on Ways and Means of Securing Publicity. This committee must be aided in its work by the individual efforts of those in all countries, who believe that the World Medical Association is worthy of support.

## CANADIAN ARMED FORCES

### News of the Medical Services

Surgeon Commander M. Wellman, R.C.N., has been appointed to the Aircraft Carrier, *H.M.C.S. Magnificent,* as Principal Medical Officer. Succeeding Surgeon Commander Wellman as Assistant Medical Director General is Surgeon Commander R. A. G. Lane, R.C.N., who has been Command Medical Officer, Atlantic Coast, and Principal Medical Officer of *H.M.C.S. Stadacona,* the R.C.N. Barracks at Halifax. Surgeon Commander E. H. Lee, R.C.N., formerly Principal Medical Officer of *H.M.C.S. Magnificent,* has assumed the appointment vacated by Surgeon Commander Lane.

Surgeon Commander H. R. Ruttan, R.C.N., who recently completed a seven months' course in dermatology at the University Hospital, Ann Arbor, Michigan, has been appointed Principal Medical Officer of the cruiser *H.M.C.S. Ontario.*

Surgeon Lieutenant Commander R. H. Roberts, R.C.N., has returned to *H.M.C.S. Stadacona,* Halifax, N.S., following a six weeks' course in medical planning in atomic warfare at the United States Naval Base, Treasure Island, San Francisco, California.

The Red Cross Symposium on Disaster Relief held in Toronto on December 5, 6 and 7, 1949, was attended by Surgeon Captain A. McCallum, O.B.E., V.R.D., Medical Director General, Royal Canadian Navy; Brigadier W. L. Coke, O.B.E., Director General of Medical Services, Canadian Army; Group Captain A. A. G. Corbet, E.D., Director of Health Services, Royal Canadian Air Force. Included in the discussions were addresses on problems of civil defence by Major-General F. F. Worthington, C.B., M.C., M.M., Civil Defence Co-ordinator, and Major-General C. G. Mann, C.B.E., D.S.O.

The 4th course on the medical aspects of nuclear energy, held at the U.S. Army Medical Centre, Washington, D.C. from November 28 to December 2, 1949, was attended by 7 active and 7 reserve officers of the Royal Canadian Army Medical Corps, bringing the total number of R.C.A.M.C. Officers who have taken the course to 59.

Lieut.-Col. C. G. Wood, O.B.E., R.C.A.M.C., recently of the Directorate of Medical Services, Army Headquarters, Ottawa, is now attending the Canadian Army staff College, Kingston, Ontario. Lieut.-Col. J. S. McCannel, O.B.E., R.C.A.M.C., who has completed the course at the Staff College, has been posted to Army Headquarters to replace Lieut.-Col. Wood as Assistant Medical Director in charge of Planning, Operations and Training.

Lieut.-Col. K. J. Coates, O.B.E., R.C.A.M.C., who has also completed the Staff College Course, has now been posted to Toronto Military Hospital as Commanding Officer, vice Lieut.-Col. R. J. Nodwell, O.B.E., R.C.A.M.C., who has been appointed Area Medical Officer, British Columbia Area.

A. MCCALLUM

## CORRESPONDENCE

### Dietary Standards

*To the Editor:*

The new dietary standards for Canada will be studied with great interest by nutritionists and the public in Great Britain, where the view is apt to prevail that the northern half of the American continent is a land flowing with milk and money.

The tables published in the Journal for November (Pett, p. 451) will receive well-deserved praise for taking account of the variations of requirements with body weight, which has long been desiirable. This will, it is hoped, help to avoid the many misunderstandings to which the "average man" has given rise.

I would like to comment on one or two points from the point of view of British experience.

The recommended allowance for vitamin A appears to be low. The figures quoted for a 140 lb. man are 4,800 I.U. as carotene or 1,150 as preformed vitamin A. Hume and Krebs (Medical Research Council Special Report No. 264, H.M.S.O., 1949) have recently shown that the minimum requirement is 1,300 I.U. of preformed vitamin, and following orthodox procedure, recommend 2,500 I.U. as adequate. We thus have a geometric progression from Canada to Britain and back to the U.S.A. with the ratios 1: 2: 4! One of us, doubtless, is sure to be right.

An examination of the dietary contributions for various menus as set forth in Table IV of the article in the Journal brings out a number of differences between British and Canadian estimates and reveals the pitfalls awaiting anyone attempting a wholesale transfer of recommended diets without careful reference to environment, food supplies and eating habits. Thus one tomato (according to Table IV) is said to yield 32 mgm. of ascorbic acid; according to British tables ("Nutritive Values of Wartime Foods", 1945), the average English tomato (2 oz.) contains only 12 mgm. of ascorbic acid. If we ate sufficient tomatoes to provide the 30 calories suggested in the Table, we would need 10 oz. and would then get 60 mgm. of ascorbic acid. There must be a profound difference between the English and the Canadian tomato! The answer to the ascorbic acid need undoubtedly is in citrus fruits which, however, have become something of a rarity in Britain.

One is delighted to note that Canadian meat is sufficiently fresh to yield 3 mgm. of ascorbic acid. British food tables show a depressing stream of zeros down the C-in-meat column.

The important and novel aspect of these tables is that they indicate a minimum level—a nutritional floor. This at least enables us to know where we stand. Other published tables and recommendations give us a ceiling which for all its attainability in some cases might as well be the blue empyrean.

ARNOLD E. BENDER
The Crookes Laboratories Ltd.,
London, Eng.

## J & L Transformer

*To the Editor:*

It was with considerable interest that we read the article entitled "The J & L Transformer in Endoscopy" under Clinical and Laboratory note on page 530 of the November, 1949 issue of *The Canadian Medical Association Journal.* We would like to direct your attention to a factual error in the text of this article wherein it is stated in paragraph one, "Until recently a positive means of obtaining electrical power for use in Endoscopy was something which was greatly desired but never accomplished". The article then continues and outlines the development of a transformer which may be operated from standard alternating current such as may be found in any household.

Transformers based upon the principle outlined in the article in question have been manufactured by several concerns for many years and distributed by the numerous physicians and hospital supply houses throughout Canada; at least two of the current advertisers in the *Canadian Medical Association Journal,* namely the National Electric Instrument Co. and American Cystoscope Makers Inc., have been manufacturing such transformers for many years. In the case of A.M.C.I. they have manufactured similar transformers for not less than twenty years. The National Electric Instrument Co. for about fifteen years have manufactured a unique transformer actuated by the regular 110 volt alternating current lines for operating the miniature lamps used in diagnostic instruments. This transformer is cylindrical in form and measures 1½" in diameter by 5" in length. Despite the miniature size of this transformer, it provides all of the characteristics outlined in the subject article.

The transformer described in the article "The J & L Transformer in Endoscopy" appears, from the illustration, to be designed to activate the diagnostic instrument through a special connector similar to a telephone jack whereas those manufactured by concerns such as National Electric Instrument and American Cystoscope Makers Inc. are designed to accommodate the standard cord tips of numerous types of electrically operated diagnostic instruments. The need for this latter facility should be apparent for the convenience of the physician who may have diagnostic instruments produced by various manufacturers, with such cord tips.

In view of the high standard of accuracy maintained by the *Canadian Medical Association Journal,* we feel that this should be drawn to your attention. We trust that our comments will be accepted in the spirit in which they are given, which is one of friendly co-operation.

INGRAM & BELL, LIMITED
C. C. WHITE

*To the Editor:*

We would like to thank Mr. C. C. White of Messrs. Ingram & Bell for his kindness in drawing to our attention what would appear to be a fatal error in the beginning of our article in the November issue of the Journal. We would like to correct the sentence and substitute the words, "not always accomplished"; so that the paragraph would now read, "Until recently a positive means of obtaining electrical power for use in endoscopy was something which was greatly desired but not always accomplished".

With regard to paragraph No. 2 of Mr. White's letter, we have nothing to say; except that in the same spirit of friendly co-operation, we would point out that in the different designs of the J & L transformer we have tried to go a little further than what we feel others have. We would like to correct Mr. White in paragraph No. 3; actually, the two black terminal posts in the particular transformer as shown in the illustration, are of the spring type with a hole through the centre and a flat base which would enable them to accommodate any type of cord; the jack and plug being only used on one particular design.

JEAN LESAGE

# SPECIAL CORRESPONDENCE

## The London Letter

*(From our own correspondent)*

### P.A.S. AND STREPTOMYCIN

In 1948 the Medical Research Council and the British Tuberculosis Association instituted a clinical trial of *p*-aminosalicylic acid (P.A.S.) and streptomycin in "acute rapidly progressive bilateral pulmonary tuberculosis, of recent development, unsuitable for collapse therapy, in young adults aged 15 to 30". Although the trial is not yet completed, a preliminary report has now been published in view of the fact that definite evidence is already available that in this particular type of tuberculosis the combination of P.A.S. and streptomycin considerably reduces the risk of development of streptomycin-resistant strains of tubercle bacilli during the first six months of treatment. As the strictest criteria have been observed in the carrying out of this trial, and as the report is based upon a series of over 150 cases, this finding constitutes an important advance in the treatment of tuberculosis.

Much further work requires to be done, including an investigation of the problem as to whether the relatively large doses of P.A.S. used (20 grams of the sodium salt daily) were necessary, but it would appear as if the unfortunate propensity of the tubercle bacillus to develop a protective mechanism to tuberculostatic or tuberculocidal drugs will be overcome by attacking the organism simultaneously by two different drugs. P.A.S. is not the only alternative drug which can be used for this purpose, and further trials will now need to be carried out to compare the relative efficiency of these.

### THE NURSING PROBLEM

A report in the *Ministry of Labour Gazette* indicates that, though there has been some improvement in the recruitment of nurses, this has by no means solved the problem of attaining and maintaining an adequate supply of nurses. In the year ending last June the number of nurses and midwives in hospitals rose by about 15,000, but there are still 30,000 vacancies on the books of the nursing appointments officers of the Ministry of Labour. There are now more nurses and midwives in practice than before the war, but the acute shortage still persists, due to the expansion of the health services and the increasing complexity of modern treatment. Another factor is the wholly laudable attempt that is being made to reduce the hours of work of nurses to 96 per fortnight. The number of nurses and midwives in training in 1949 was 57,800, compared with 43,000 in 1943. In an attempt to overcome the present shortage there has been a marked increase in the number of part-time nurses and midwives—from 12,000 in 1947 to 26,000 in 1949.

### CLEANER MILK

This country is still anything but a pioneer in the field of ensuring a clean milk supply to its citizens. Yet another report has been published on the subject—this time by a joint committee of the British Medical Association and the National Veterinary Medical Association. It is a striking commentary upon the state of affairs

over here that this admirable report should need to contain the platitudinous recommendation that "all milk should be from tubercle-free cows and should be pasteurized". Other recommendations are that there should be only two designations of milk, as tuberculin-tested, and pasteurized, and that the ultimate aim should be one grade only—pasteurized, tuberculin-tested milk. Much attention is devoted to the present confused administrative situation, with the Ministry of Agriculture, the Milk Marketing Board and local health authorities all involved, and it is pointed out that the local health authority is the obvious controlling centre for the cleanliness of milk. Outspoken comments are made upon the efforts of the Ministry of Agriculture to increase the supply of milk without adequate attention to its disease-transmitting properties. At the moment we have the curiously Gilbertian situation that town-dwellers receive milk which is stale but safe, whilst country-dwellers receive milk which is fresh but dangerous. Perhaps one day we shall attain the happy position of supplying all our citizens, whether urban or rural, with milk which is both fresh and safe.

### Medical Officers of Health Reports

Reports of medical officers of health seldom receive the publicity they deserve. Written with care and thought and based upon a mass of carefully analyzed statistics, they often throw an interesting light upon national, and even international, problems. An interesting recent example, taken more or less at random, is that of the medical officer of health for a large industrial city in Lancashire, covering 1948. In pointing out that the dental care of expectant and nursing mothers and of children was being neglected because of the rush for dentures, the comment is made that "it is deplorable that the dental resources so limited in man-power, should be diverted from the needs of the future".

Birth rate, mortality rate and infant mortality rate all fell, compared with the previous year, the respective figures being 24.2 to 21.1; 13.8 to 11.8 per 1,000 of the population; 61 to 42. This last figure is the lowest recorded in the city's history: in 1941 the infant mortality rate was 96. This improvement is attributed primarily to better and more sensible nutrition, a better understanding of health rules, and better education of parents. Whilst a certain proportion of the credit must undoubtedly be given to the curative services, there is a tendency just now in this country to ignore the preventive side of medicine, and to lay all the emphasis on the curative side. Housing is a good case in point. The M.O.H., whose report has just been mentioned, refers to the urgent need for more houses, and the same plea is made by the Scottish committee of the British Medical Association who, "seriously perturbed by the increasing prevalence of tuberculosis in Scotland", are demanding more houses to overcome the gross overcrowding to which they attribute this alarming increase in tuberculosis. WILLIAM A. R. THOMSON

London, January, 1950.

# ABSTRACTS FROM CURRENT LITERATURE

## Medicine

**The Treatment of Pneumonic Meningitis with Penicillin.** Appelbaum, E., Nelson, J. and Albin, M. B.: *Am. J. M. Sc.*, **218:** 260, 1949.

The authors report 120 cases of pneumococcic meningitis treated with penicillin and sulfonamide. The penicillin was given by intrathecal and intramuscular injection; in 8 cases the intraspinal route was omitted. There were very few reactions and no serious complications could be attributed to the giving of the penicillin by the intrathecal route. There was a recovery rate of 73% for the total group with a poorer prognosis in the older age patients. In the 8 patients who received intramuscular but not intraspinal penicillin the results were not considered to be as satisfactory as they were in the cases treated by both channels. G. A. COPPING

**Intrathoracic Extrapulmonary Tumours: Diagnosis and Surgical Treatment.** Harrington, S. W.: *Postgrad. Med.*, **6:** 6, 1949.

The incidence of mediastinal tumours is probably no greater than formerly but, due to the increased use of routine roentgenograms, they are encountered more frequently. A large percentage of intrathoracic tumours are benign but all should be considered potentially malignant. The present study consists of 168 cases. The most important considerations in the surgical treatment of mediastinal tumours are early diagnosis, preoperative preparation, selection of approach, maintenance of intrapulmonary pressure, complete removal and postoperative care.

The diagnosis and selective effective treatment demands the close co-operation of the clinician, the roentgenologist and the surgeon. The clinical manifestations of benign tumours are rarely pathognomonic and, even after correlating the diagnostic results, it is often impossible to clinically determine the type of lesion present. The position of the tumour often suggests the type of tumour present and influences the subjective symptoms. Roentgenograms and stereoroentgenograms are the most important of the several diagnostic aids. The latter are rarely conclusive and the author usually utilizes the more conservative methods of diagnosis, and if surgical intervention is indicated, he does an exploratory thoracotomy. Roentgenologic studies also aid in determining the most accessible type of approach to the tumour and the conditions that might, after operation, become complications. In this series the most frequent mediastinal tumours were neuroblastomas (30.3%), teratoid tumours (23.8%), mediastinal cysts (21.4%) and fibromas (6.5%). In the total of 168 cases, there were 7 operative deaths (4.2%). Of the remaining 161 cases, in 33 cases, the tumour removed was malignant. To date, approximately 50% of these patients had recurrence of the lesion and died. The 128 patients with benign lesions have been relieved of symptoms and there have been no recurrence. J. F. SIMPSON

**Electroshock Therapy in Depressive States.** Stone, S.: *New England J. Med.*, **240:** 203, 1949.

Electroshock therapy is valuable in involutional depression, cyclic depressive states, reactive and late life depressions, early cases of schizophrenia and certain psychoneuroses which have failed to respond to other forms of treatment. Recovery is effected in about 85% of cases of involutional depression and early institution of shock therapy in these patients will abort, or greatly shorten, the duration of mania and depression. Facilities should be available in general hospitals for electroshock therapy since this will result in earlier treatment of the patient and will do away with the feeling of ostracism associated with admission to a mental hospital. It is recommended that even the smaller general hospitals should have one or more rooms equipped for the treatment of psychiatric patients with acute, mild disturbances which are amenble to rapid improvement. NORMAN S. SKINNER

**Development of Cardiac Murmurs in Successfully Treated Cases of Bacterial Endocarditis.** Beebe, R. T. and Menealy, J. K.: *New England J. Med.*, **240:** 372, 1949.

The presence of a cardiac murmur is generally considered essential in the diagnosis of bacterial endocarditis. Three cases are presented without any murmur at the time of diagnosis but in each patient marked murmurs developed during the course of successful treatment with penicillin. Subacute bacterial endocarditis must be considered in the differential diagnosis of appropriate cases even in the absence of cardiac murmurs. NORMAN S. SKINNER

**Venous Thrombo-embolic Phenomena.** Cook, A. W. and Lyons, H. A.: *Am. J. M. Sc.*, **218:** 155, 1949.

Studying a group of 45 naval veterans on the neurosurgical wards of the United States Naval Hospital, St. Albans, New York, these authors have shown that in this group composed of patients with paralyses and immobility of various bodily members a total of 115 man-years of complete lack of movement of the parts has not in any instance resulted in the development of a pulmonary embolus from these immobile muscles. It might be expected that the absence of the compression of muscle upon the local veins would lead to stagnation and to thrombosis but this has not happened.

The authors query the importance of stasis *per se* as a factor in the development of thrombi, especially in the young and are inclined to believe that there is a factor associated with advancing age which may be decisive. They question whether there may not be a senile reduction in heparin production accountable. It is of interest that many of these men had operation procedures carried out upon the paralyzed limbs without resulting phlebothrombosis developing. G. A. COPPING

**The Treatment of Gonorrhœal Arthritis with Penicillin.** Spitzer, N. and Steinbrocker, O.: *Am. J. M. Sc.*, **218:** 138, 1949.

Comparing the results in the treatment of gonococcal arthritis in the non-specific era with those which have resulted from the use of hyperthermy and of the sulfonamides and, now, of penicillin, the authors conclude that, starting with the fever therapy period, a new era in the treatment of this disease has been introduced. The technical difficulties of administering fever therapy and the occasional undesirable complications have restricted its use. The sulfonamides have proved highly effective. Figures with complete recovery in all cases where penicillin therapy was given over a period of 5 to 10 days are quoted to indicate its value.

Twenty-eight cases of average duration of arthritis of 7 days were treated with penicillin by the authors, giving doses of 0.5 to 9.3 million units over periods varying from 3 to 30 days, the larger doses and the longer periods being for the most part for cases which did not respond. The possibility that some of the failures may have been errors in diagnosis is admitted, as in only a few were gonococci found in joint aspirations. Prompt subsidence of fever and local redness and swelling resulted in the favourable cases. Of the 28 cases treated 8 were completely cured, 15 greatly improved and 5 not improved. The authors conclude that improvement in 23 out of 28 cases equals the results obtained with the sulfonamides or fever therapy and is much better than those of earlier days. They stress the importance of associated physiotherapy for these patients and point out that earlier mobility and exercising of affected parts is now possible. G. A. COPPING

## Surgery

**Surgical Treatment of Duodenal Ulcer — Comparison of Results With and Without Vagotomy.** Crile, G. Jr., Jones, T. E. and Davis, J. B.: *Ann. Surg.*, **130:** 31, 1949.

Half the patients operated upon between 1942 and 1948 had a gastric resection or gastroenterostomy, half had a transabdominal vagotomy with pyloroplasty or gastroenterostomy, but otherwise all 174 cases were similar in average age, duration of symptoms and complications of duodenal ulcer. None were operated upon unless proved intractable to medical treatment. The first group were advised to have frequent feedings and antacids and to stop smoking and drinking, but the second group were given no advise as to management after the 6th week postoperative. The situation at the end of one year in each case is the basis for comparison.

There were two deaths in the gastrectomy group and one death after vagotomy. The postoperative course was similar in both groups except that ulcerlike pain was very rare after vagotomy and frequent after gastrectomy. Two vagotomy patients had persistent diarrhœa, and five patients in the first group had some diarrhœa. When questioned as to the general feeling of well-being, the vagotomy patients had fewer complaints than the first group. Three demonstrable jejunal ulcers and 4 hæmorrhages occurred in the first group during the first year after operation. One jejunal ulcer in the vagotomy group was in a patient who still had a response by acid to insulin. Vagotomy patients had less abdominal pain of all kinds postoperatively. The authors state that in the first 18 months after operation, vagotomy with gastroenterostomy or pyloroplasty has given better results than gastric resection or gastroenterostomy alone. BURNS PLEWES

**The End Results of Thyroidectomy.** Fahrni, G. S.: *J. Int. Col. Surg.*, **12:** 414, 1949.

Propylthiouracil is thought to interfere with thyroxin and causes clinical improvement in patients with hyperthyroidism. The goitre may become larger. Complications are not as common as with thiouracil. But the 1% mortality from postoperative crises in severe cases prepared only with iodine should be decreased, especially if the surgeon is a good technician and guards against postoperative embolism, and pulmonary complication. It takes a long time and is unnecessary to prepare a mild case of hyperthyroidism with propylthiouracil when iodine preparation takes only 8 to 12 days. Nodular goitre may cause auricular fibrillation and demineralization of vertebræ without abnormal elevation of the basal metabolic rate. These may slowly improve after thyroidectomy. Carcinoma of the thyroid is usually secondary to an adenomatous goitre. Aberrant thyroid nodules are commonly malignant. Nodular goitres should be operated upon early. BURNS PLEWES

**A Study of Mortality in a Burns Unit.** Bull, J. P. and Squire, J. R.: *Ann. Surg.*, **130:** 160, 1949.

The results of burn treatment in 794 hospitalized cases in terms of age and area burned were examined. These patients were segregated in a special Burns Unit, given adequate fluid replacement, protected against infection, skin grafted as required, and given generous diets in the Birmingham Accident Hospital. No minor burns were included. The extent of the burn was evaluated in percentage of the body area on admission. It is obvious that the mortality depends on the area of burns and the age of the patient. Area for area a deep burn is four times as serious as a superficial one, but estimation of depth is hard to judge and is subject to revision as healing progresses.

The mathematical data from this large series of burns was subjected to the "Probit Analysis", the theory of which and its application to mortality rates in burned patients is discussed. The "Provit Values" tables given make it possible to state the percentage of body area burned which is likely to cause death in 50% of patients within a certain age group (*e.g.*, 51% between 0 and 14 years of age, 9% over 65 years). The construction of tables of probability of mortality at every age and percentage area burned is described. Thus the results of various treatments in series of cases may be compared from different centres, and methods which may be of greater value in different age groups evaluated.

The idea on which the theory is based necessitates the concept that no matter how severely burned the patient may be, some probability of his survival remains. It is felt that as many lives have been saved by plasma transfusion as by the cintrol of infection. Similar analyses for conditions other than burns are suggested and the likelihood of finding a general "law of ageing" discussed. BURNS PLEWES

**Massive Hæmatemesis.** Costello, C.: *Ann. Surg.*, **129:** 289, 1949.

Of 300 patients who had vomited sufficient blood that they showed shock and/or anæmia, 57% had chronic duodenal ulcer, 1.3% were undiagnosed, 14% had acute gastritis, 11% chronic gastric ulcer, 8% ruptured œsophageal varix, 4% chronic gastritis, 1.3% gastric carcinoma, 1.3% marginal ulcer, 0.6 Curling ulcer, 1% carcinoma of œsophagus, and 0.3% were traumatic. The mortality was 25%, being less in younger patients and rising to 38% in the seventh decade. All patients who suffered massive hæmorrhage from carcinoma of the stomach, Curling ulcer, and most who bled from marginal ulcers, ruptured varices, carcinoma of the œsophagus and chronic gastric ulcer, died.

Microscopic studies of the eroded large vessels in the base of chronic ulcers usually showed partial thrombosis and in these cases there was little fresh blood in the stomach. Death was often not due to continued acute hæmorrhage, but to the complications of diminished blood volume (shock, cardiac failure, anæmia, pneumonia, etc.). The theory that restoring blood pressure risks "blowing out" a forming thrombus has no scientific substantiation. The treatment should be the replacement of as much blood as has been lost as promptly as possible. Such transfusions plus feeding resulted in lowering the mortality from 25 to 4%. A blood bank is necessary for such treatment, for these cases often require 3 or 4 litres of blood in the first 24 hours. Intravenous saline is condemned. Plasma is the best whole blood substitute. The need for blood is best estimated by the copper sulphate method. Passing a tube into the stomach for lavage or suction is dangerous unless there is distension and nausea. A polypeptide and vitamin mixture is given every two hours orally. Sedatives should be given every two hours rather than p.r.n.

Patients with active or recent massive gastro-intestinal hæmorrhage should not be subjected to enthusiastic diagnostic routines. Barium series and gastric analyses should be delayed till the thrombus has organized 10 days after the cessation of bleeding. BURNS PLEWES

## Obstetrics and Gynæcology

**Occurrence of Uterine Fundus Carcinoma After Prolonged Œstrogen Therapy.** Vass, A.: *Am. J. Obst. & Gynec.*, **58:** 748, 1949.

Two cases of uterine fundus carcinoma occurring after prolonged administration of œstrogens are reported. In both cases the sequence of events, together with the known properties of œstrogens, strongly suggests an etiological relationship. For this reason it is believed that there should be no promiscuous therapeutic use of estrogens. ROSS MITCHELL

**Penicillin Therapy in the Obstetrical Patient.** Guilbeau, J. A., Schaub, I. G. and Andrews, M. C.: *Am. J. Obst. & Gynec.*, **58:** 101, 1949.

Uterine cultures were taken from 86 postpartum patients, 54 of whom received varying amounts of penicillin, and 32 of whom received no antibiotic therapy. From 30 of the 32 cultures in the control series from untreated patients, various bacteria were isolated, predominantly anaerobic streptococci and bacteroides. Of the uteri of 54 patients receiving penicillin therapy, 32 were sterile aerobically and anaerobically, and eight yielded only pneumonia-like organisms. Only 14 cultures in the penicillin series showed significant bacteria, 4 of which were penicillin-resistant coliform organisms. All but one of the penicillin-sensitive organisms occurred in cultures taken more than 48 hours after delivery, from patients receiving small amounts of penicillin. The possibility of disinfecting the postpartum uterus by penicillin therapy has obvious clinical applications.
ROSS MITCHELL

**The Establishment of Extra-Uterine Respiration.** Morison, J. E.: *J. Obst. & Gynæc. Brit. Emp.*, **56:** 401, 1949.

Throughout the whole of intra-uterine life the lung is undergoing development in preparation for extra-uterine life. Tissue sections, even serial sections, are difficult to understand, and a better appreciation of the increasing complexity of the lung during development has been attained by making casts of the entire air space system to its most terminal ramifications by an injection technique with neoprene latex (Morison, 1948). These casts are prepared by removing all soft tissues with strong acid. The three-dimensional effect obtained requires stereoscopic microscopy for its study. It is also possible by dissecting the injected lung without maceration to retain all the intricate pattern of blood-vessels, epithelium, and elastic tissue around the casts of the air spaces. The elastic tissue network extends to the terminal air spaces at term, but in the premature fetus of 25 to 30 weeks no such supporting tissue is present even in the walls of large air spaces opening from bronchioles. As the fetus develops, certain features, such as the appearance of interruptions in the epithelial lining of the air spaces and the growth of capillary networks into the walls of the distal air spaces, which are so essential for postnatal oxygen exchange in the lungs, can be better appreciated in tissue sections. P. J. KEARNS

**Fetal Mortality in Toxæmia of Late Pregnancy According to Mode of Delivery.** Hamilton, J. and Lister, U. M.: *J. Obst. & Gynæc. Brit. Emp.*, **56:** 427, 1949.

From the standpoint of the fetal results by mode of delivery 1,156 consecutive cases of "albuminuria without convulsions" uncomplicated by accidental antepartum hæmorrhage or abortion were investigated. Of the 1,226 babies concerned, 99 died *in utero* before the onset of labour and these were excluded. Among the remainder there were 75 stillbirths and 48 neonatal deaths. Forceps delivery, no matter whether the onset of labour is spontaneous or induced, does not increase the fetal mortality-rate. The death of babies following vaginal operative procedures may be the result of the conditions necessitating the application of forceps (*e.g.*, prolonged labour, fetal asphyxia), rather than the operation itself. When labour is induced by artificial rupture of the membranes the fetal risk increases with the induction-delivery time interval. This method of induction of labour, therefore, should not be used unless a low presenting part and a well-effaced cervix promise quick and easy delivery.
P. J. KEARNS

**The Relief and Prevention of Referred Pain.** Theobald, G. W.: *J. Obst. & Gynæc. Brit. Emp.*, **56:** 460, 1949.

Backache, lower abdominal pain, frequency and urgency of micturition together with stress incontinence, and headache may not infrequently be cured by cauterizing the cervix with a stick of silver nitrate in the out-patient department. This routine procedure has been made possible by the fact that the pain so caused may be temporarily abolished by the intradermal injection of 10 ml. of a 1% solution of procaine. Reasons are advanced to suggest that these symptoms are not due merely to infection and distension of cervical glands. Equally satisfactory results may be obtained by cauterizing an apparently healthy cervix. Lower abdominal pain may be referred from a structure in the pelvis, or may arise in the sheath of the rectus abdominis and other muscles. The former pain may often be permanently relieved by the intradermal injection of a 1% solution of procaine into the affected area, while the latter responds to the injection of a similar solution of procaine deep to the fascial sheath. A number of patients complaining of dysmenorrhœa had painless periods for several months following the intradermal injection of a 1% solution

of procaine. Pain often arises at the tendinous insertion of muscles to the bony outlet of the pelvis, and to Poupart's ligament. It may also be stressed that pain in the breast not infrequently arises in localized areas of attachment of the intercostal muscles to the ribs. Referred pain may occasionally be relieved by the intradermal injection of physiological saline solution. In the absence of muscle spasm and obvious limitation of movement, backache may frequently be cured by the injection of a 1% solution of procaine into the sacro-iliac ligaments or by the removal of pelvic tumours, notwithstanding the presence of bony changes in the affected areas. P. J. KEARNS

**Rubella in Pregnancy as an Etiological Factor in Congenital Malformation, Stillbirth, Miscarriage and Abortion.** Part I, Swan, C.: *J. Obst. & Gynæc. Brit. Emp.*, **56:** 363, 1949.

Up to the present time a total of 9 miscarriages, 56 from rubella, has been reported, including 3 by Wesselhoeft, 2 by Aycock and Ingalls and 4 by Ober, Horton and Feemster. In 2 instances the mother had suffered from German measles in the first month of pregnancy, in 2 in the second month, in 3 in the third month and in 2 in the fourth month. In all, 25 stillbirths have been described; they comprise 1 by Fox and Bortin, 1 by Aycock and Ingalls, 1 by Goar and Potts, 4 by Ober, Horton and Feemster, 1 by Gronvall and Selander, 16 by Swan, and 1 by Bardram and Braenstrup. (The baby examined by Fox and Bortin was hydrocephalic and the one studied by Bardram and Braenstrup had bilateral cataract. The infant investigated by Goar and Potts was a twin; its fellow, born alive, suffered from bilateral cataract disease.) The time of onset of the maternal infection during gestation was as follows: first month 3 cases, second month 7, third month 4, fourth month 3, fifth month 2, sixth month 1, seventh month 1, eighth month 1, and month indeterminate 3. P. J. KEARNS

## Dermatology

**Kaposi's Varicelliform Eruption. Report of a Case.** Freedman, S. S. and Barrett, J. T.: *New England J. Med.*, **241:** 644, 1949.

The authors review the history of the disease, which is arousing increasing interest in recent years, and the various opinions as to its etiology, now fairly generally accepted as the virus of herpes simplex inoculated upon the skin of an infant suffering from atopic eczema. They believe that the syndrome may be caused not only by the virus of herpes simplex, or of vaccinia, but also possibly by other virus not yet identified. In the treatment of their illustrative case, in addition to symptomatic and supportive measures, they also administered 200,000 units of penicillin for 4 days. They advocate antibiotics such as penicillin for protection against complications which may be produced by secondary pyogenic organisms.
D. E. H. CLEVELAND

**Eczema Vaccinatum. Rapid Recovery Following Treatment with Aureomycin.** Perry, F. G. and Martineau, P. C.: *J. A. M. A.*, **141:** 657, 1949.

The authors define eczema vaccinatum as a form of generalized vaccinia found in persons, usually children under 5 years, the subjects of atopic eczema. Although it has been stated by some that eczema vaccinatum and Kaposi's varicelliform eruption are identical, and also that it is impossible to differentiate them clinically, it is emphasized that the causative viruses isolated from them are entirely different. Paul's test shows acidophilic intracytoplasmic inclusion bodies in eczema vaccinatum, while in Kaposi's varicelliform eruption much smaller basophilic intranuclear inclusion bodies are found.

A case is described in a boy aged 2 years who had atopic eczema. He was exposed intimately to a child whose recent vaccination was uncovered and crusted. Paul's test for vaccinia virus was positive. Penicillin in dosage of 20,000 units every 4 hours was given for 2 days, and then replaced by 250 mgm. of aureomycin every 6 hours. Clinical improvement of the eruption was rapid and the temperature fell to normal in 72 hours. The dosage of aureomycin was then reduced to 500 mgm. per 24 hours. The rapid recovery following use of aureomycin suggested to the authors that aureomycin may be of special value in this and other dermatotropic virus infections. They think it may be valuable for controlling secondary infection or it may exert some specific antibiotic effect on the virus.
D. E. H. CLEVELAND

## Neurology and Psychiatry

**The Dermatologist and the Psychiatrist.** Gottesman, A. H. and Menninger, K.: *Bull. of Menninger Clinic*, **13:** 119, 1949.

This is a discussion of the general aspects of overlapping between dermatologic and psychiatric problems, both in regard to emotional factors contributing to skin conditions, and in regard to the personal reactions of individuals to skin disease. Various possibilities of treatment are discussed: (1) symptomatic treatment of the skin lesion alone, regardless of possible emotional maladjustment; (2) Combined treatment of the medical and psychological components by the dermatologist; (3) Concurrent treatment of the patient by both dermatologist and psychiatrist; and (4) Treatment by the psychiatrist alone. The authors come to the conclusion that the combined medical and psychological therapy by the dermatologist is probably the one most frequently indicated, but that competence in the proper handling of the emotional factors by the dermatologist can only come from an understanding of fundamental psychiatric principles. W. DONALD ROSS

**Treatment by Suggestion of Verrucæ Planæ of the Face.** Obermayer, M. E. and Greenson, R. R.: *Psychosom. Med.*, **11:** 163, 1949.

Dermatologists are generally aware of the apparent value of suggestion for the removal of warts. Attitudes to this phenomenon range from skepticism to mystified acceptance, with intermediate attempts at explanation such as that of the authors who conceive that suggestion might produce a spasm of the skin capillaries leading to reduction in blood supply of the lesions. One is a dermatologist and the other is a psychiatrist, and they report a case which they have demonstrated before the Los Angeles Dermatological Society. The verrucæ planæ studded over her face had failed to respond to various oral and local medications and to the intimation that further roentgen treatment such as she had had for acne vulgaris would do the trick. She had three interviews with the psychiatrist including two hypnotic sessions and the verrucæ cleared up within two weeks of the last session. The authors emphasize that such treatment should not be undertaken without psychiatric assessment that there are no contradictions for hypnosis.
W. DONALD ROSS

**The Long-term Results of Injuries of the Head (A Medical, Economical, and Sociological Survey).** Rowbotham, G. F.: *J. Ment. Sc.*, **95:** 336, 1949.

This is a report by a neurosurgeon which comes to conclusions which are essentially psychiatric. Questionnaires were sent to 1,000 individuals who had had head injury before 1935. Only 430 replies were received and 93 of these individuals were examined directly. The most striking findings from questionnaire and examination revolved around the deterioration in economic performance of these individuals. Symptoms, most commonly headaches, dizziness, and insomnia, did not seem to account for the degree of disability. Emotional disturbances, with secondary gains, in addition to, or in place of monetary ones, appeared to be present, including a loss of initiative and sense of responsibility. Lump-sum compensation settlement helped to get a man back to useful employment earlier, but did not seem to provide a cure any more than did adequate compensation on a continuing basis. The author concluded that the sequelæ of closed head injuries could be minimized by adequate treat-

ment in the acute stage, judicious medical rehabilitation, and replacement in a job consistent with their capacities. There seems to be some oversight of the likelihood that the 570 individuals who did not reply were getting along much better because they showed no interest in replying. The question of a job consistent with their capacities also begs the question as to what their capacities might be with adequate psychiatric treatment of the traumatic neurosis which the author is essentially describing. W. DONALD ROSS

**The Accident-Prone Automobile Driver.** Tillmann, W. A. and Hobbs, G. E.: *Am. J. Psychiat.*, **106:** 321, 1949.

This is a study carried out by the psychiatrically oriented Department of Clinical Preventive Medicine of the University of Western Ontario. Previous literature has indicated that a small proportion of any group of individuals is subject to a high proportion of the accidents incurred among the entire group, and that the "accident-prone" individuals who comprise the small proportion tend to have certain personality characteristics in common. In London, Ont., the bus drivers could be divided according to accident rate so that 10% of the drivers accounted for 25% of the total bus accidents. Intensive interviews were carried out on taxi drivers divided into high accident and low accident groups. The high accident taxi drivers had the following characteristics: unstable family background with broken homes, aggressive instability in childhood or excessive fears in childhood, truancy and aggressive sports in school days, frequent changes of jobs, superficial and shifting social contacts, promiscuity, good health with few functional symptoms, immature unconventional boastful behaviour, careless driving, being more critical of others than of themselves, and a fatalistic, rebellious, and short-term motivated philosophy of life. The low accident taxi drivers had the following features: Stable family background, timidity and shyness in childhood, participation in group sports but not so aggressively and no truancy from school, stable employment record, stable friendships and hobbies, responsible family life, poorer health than the other group, with more functional complaints, quiet and conscientious, cautious drivers, and concern for others and for long term goals. Case histories are presented of both types and of an individual who changed in character from the first to the second type with a great drop in accident rate. A comparison was also made between 96 male drivers in the general population who had suffered 4 or more automobile accidents and 100 unselected drivers in the same district. The "accident-prone" group showed a significantly higher record of registration with social agencies for family problems, venereal disease, and various delinquencies. The data altogether support the idea that "accidents" are not "chance" but are related to patterns of living, and hence are subject to prevention by a mental hygiene program.

W. DONALD ROSS

## OBITUARIES

**Dr. Enoch Turner Atkinson** died suddenly at his home in Barrie, Ont., on December 23. He was in his 70's. Born on a farm near Guthrie, Oro Township, Dr. Atkinson attended Barrie Collegiate and graduated in medicine from the University of Toronto in 1904. After practising in Jarrett for three years and in St. Catharines for 20 years, Dr. Atkinson settled in Barrie. He leaves four brothers and three sisters. He was unmarried.

---

**Dr. E. A. Braithwaite**, longest-serving member of the Royal Canadian Mounted Police and medical officer of the original Northwest Mounted Police, died December 7, in hospital in Edmonton. He was 87. He was appointed chief provincial coroner in 1896 and held the office until his retirement in 1948. He was named medical officer of the Northwest Mounted Police in 1884 and retired from the force in 1931. His name was kept on the nominal roll until his death. A pioneer Alberta physician—First medical officer for Edmonton from 1892 to 1907, he was born in Yorkshire, England, in 1862 and came to Edmonton in 1884. Dr. Braithwaite was for many years provincial commander of the St. John Ambulance Association and won a citation as brother of the Venerable Order of St. John of Jerusalem in 1933.

---

Le **Dr Louis-Thomas Caron,** l'un des plus anciens médecins de la province, est décédé à Maskinongé le 29 novembre à l'âge de 83 ans. Il comptait 57 années de pratique de la médecine. Il laisse deux fils et quatre filles.

---

**Dr. Charles Alpin Donkin** died at the Nova Scotia Sanatorium, Kentville, December 21, 1949, after an illness of some twenty months. He was born at Amherst, Nova Scotia, in 1890. He first studied at Mount Allison University and then at Dalhousie University, from which he graduated in Medicine in 1920. His first practice was at Musquodoboit. In 1924 he moved to Bridgewater where he practiced continuously until 1948. Dr. Donkin was most active in all community efforts, serving as President of the Bridgewater Tuberculosis Council for ten years. He served as a town councillor for four years and as a school commissioner for fifteen years. For several years he was secretary of the Lunenburg-Queens Medical Society.

---

**Dr. William Egan,** aged 52, died in England on December 17. Native of Montreal, he received his early education at Plateau Academy and St. Lawrence College in Montreal and graduated from King's College, London, in 1926. A year later he joined the staff of the old Canadian department of pensions and national health. At the time of his death he was a medical officer in immigration medical services. Dr. Egan was a member of the Royal College of Surgeons and held a licentiate in the Royal College of Physicians. Survivors include his widow, a son, a daughter and three sisters.

---

**Dr. James R. Gibson**, aged 65, who had practised in Toronto as a physician and surgeon for the past 38 years, died on December 20 after a brief illness. Born at Millbank, he graduated in medicine from the University of Toronto in 1909. He was on the staff of the Toronto Western Hospital and was a member of the Academy of Medicine, the Masonic Order and the York Downs Golf Club. He leaves his widow and one son.

---

**Dr. W. Fulton Gillespie.** His many friends throughout the Dominion of Canada were saddened by the report of the death of Dr. Fulton Gillespie on December 3, 1949. Dr. Gillespie's ready wit, warm personality and gentlemanly courtesy had won him a host of friends, both in and out of the medical profession. He "grew up" with the city of Edmonton and carried on the fine traditions of medical service associated with the name of his father, Dr. Alexander Gillespie, one of Edmonton's pioneer family physicians.

Dr. Fulton Gillespie was born in Manilla, Ontario, in 1891. He received his public school education in Lindsay, Ontario, and came to Edmonton in 1906. Here he received his secondary education and his B.A. degree from the University of Alberta. He taught school in Dawson City for some two years and then entered the University of Toronto and graduated in medicine in 1920. Always a student, Dr. Gillespie found time to gain his Master's degree in Philosophy from the University of Alberta, and his Master's degree in Surgery from the University of Toronto in 1929. In 1935 he took postgraduate work in London, England, where he was a clinical assistant at St. Mark's. In October, 1938, he was appointed Professor of Surgery at the University of Alberta and Director of the Department of Surgery

at the University of Alberta Hospital, which appointments he held until his death. Dr. Gillespie was an unusually competent and interesting teacher. His comprehensive lectures in Surgery and his astute kindly observations in the philosophy of living will be immortalized through his many hundreds of students, some of whom are now outstanding teachers in the great universities of Canada and the United States. As well as being a thorough well-trained scientist, Dr. Gillespie was unusually interested in the liberal arts. He was one of Edmonton's outstanding musicians and his friends gratefully remember many happy evenings with him at the piano.

A Fellow of the Royal College of Surgeons of Canada, and of the American College of Surgeons, he had many honours bestowed on him by his medical confrères. He was a past president of the Edmonton Academy of Medicine, of the Alberta Medical Association and of the Royal College of Surgeons of Canada. At the time of his death he was president of the Clinical Surgical Association of Western Canada. Liberally educated, truly thoughtful, and a man of firm convictions, Dr. Gillespie was never over-assertive. In his conversation and the expression of his opinions he evidenced that courteous restraint which characterizes the gentleman. The poor in purse, the poor in body and the poor in mind came to him for help. All received his best. May one close by quoting a tribute offered Dr. Gillespie at his funeral, "His was a life of high service, humbly offered".

A. C. MCGUGAN

---

**Dr. Arthur Larose** died on December 5, 1949 at the age of 83. With his passing, northern Manitoba lost one of its pioneers and a lover of its wide open spaces. In 1902 when The Pas was an outpost village in the Northwest Territories he settled there as a medical officer for the Indian Affairs branch and thus became the first permanent doctor of what is now northern Manitoba. His duties led him to use all methods of transportation—canoe, dog team, and towards the end the automobile and airplane. Born September 26, 1866 at Vercheres, Que., he studied at L'Assomption College and obtained his medical degree from Victoria University, Toronto, in 1890. In 1933 he was made a life member of the College of Physicians and Surgeons of Manitoba. In the influenza epidemic of 1919 he did valiant work for the Indians who suffered heavily from the disease. He brought not only medical care but also provisions to the widely scattered stricken settlements, and thus saved many lives. His life was one of devotion to duty. He is survived by four daughters and one son.

---

**Dr. Robert Lawson,** of Shoal Lake, Man., died on December 4 after a brief illness. Born on the family homestead on the Fourth Concession in West Flamboro, 85 years ago, he had lived in Shoal Lake since 1888. His wife died some years ago. Surviving are two sons, one daughter, one brother and four sisters.

---

**Dr. Edmund Percival Lewis,** city director of mental hygiene, died on December 3 at Toronto General Hospital. He was 66. Dr. Lewis was born in St. Thomas, and was an arts graduate of McMaster University. In 1915 he graduated from the University of Toronto in medicine. During the First World War he served overseas with the artillery. He studied psychiatry and mental hygiene in the United States on a Rockefeller Fellowship. Later he did postgraduate work at Queen's Square Hospital, London, England. He was chairman of the provincial advisory board. He was a past master of Ashlar Lodge, A.F. & A.M., a member of the Scottish Rite, Rotary Club, York Downs Golf Club and many medical societies. Surviving are his widow and one sister.

---

**Dr. Albert George McAuley** died on December 28, 1949, in Montreal. He was 76. A graduate of McGill University Medical School, Dr. McAuley had been in hospital two years. Born in Ventnor, Ont., Dr. McAuley did postgraduate work at the Boston Eye, Ear and Nose Infirmary as well as in Europe. An active worker in St. Patrick's Roman Catholic parish, he was a member of the Knights of Columbus. He is survived by a sister.

---

**Dr. Ewart E. McPherson** died suddenly at his home in Blenheim, on November 27. Although he had not been in good health for some time, death came very unexpectedly just before noon when he suffered a heart seizure. Born in Cedar Springs 57 years ago, he received his early education in the schools of Cedar Springs, Blenheim and Chatham, after which he entered the University of Toronto. Graduating in 1916 with the degree of Bachelor of Medicine, he enlisted and served overseas with the rank of Captain, in both England and France. Returning in 1919 he spent some time as resident surgeon at St. Michael's Hospital, Toronto. In 1920 he came to Blenheim. He was a member of the Ontario Medical Association and a past secretary of the Kent Medical Society. For many years he served as coroner of this district, and until the formation of the Kent County Health Unit was Medical Officer of Health. Besides the manifold duties of his own profession he found time for interest in local organizations. He was a member of Kent Lodge No. 274, A.F. & A.M. He was also a member of Blenheim Rotary Club, in which he served as President in 1937-38. He was a member and faithful supporter of Blenheim United Church, and was also a member of Blenheim Branch No. 185 Canadian Legion. Surviving are his widow, one son, one daughter, and his father.

---

**Dr. Murray C. Morrison,** aged 54, professor of radiology at the University of Western Ontario and past president of the Canadian Association of Radiologists, died in St. Joseph's Hospital, London, on November 27, after being ill three weeks with a heart condition. Born in London, he graduated at University of Western Ontario in 1918 and spent a year in the Canadian Army Medical Corps. He was senior intern in the University of Michigan Hospital, 1929-30, and resident radiologist and instructor in radiology, 1930-31. Returning to London in 1932, he was appointed instructor in radiology in the University of Western Ontario Medical School. He was a member of the American College of Radiology and the Radiological Society of North America and was a fellow of the Faculty of Radiologists (England). He was also radiologist at St. Joseph's Hospital and had just completed two years as chairman of the hospital medical staff. Surviving are his widow and two daughters.

---

Le **Dr J.-O. Mousseau** est décédé le 6 décembre, en sa demeure à Ville Mont-Royal, à l'âge de 64 ans. Né à Lavaltrie, il avait fait ses études classiques au séminaire de Joliette et ses études médicales à l'Université Laval, de Montréal. Il avait été interne à l'Hôtel-Dieu et il était gouverneur à vie de l'hôpital Notre-Dame. Ses activités de toutes sortes le firent se dévouer aux organisations de la paroisse Sainte-Cécile dont il fut marguillier. Egalement, il s'intéressa à la Caisse populaire Sainte-Cécile dont il est un ancien président. Il laisse son épouse, un fils, deux filles et un frère.

---

**Dr. Edward B. O'Reilly** died in Hamilton on November 24. Born in Hamilton, Ont., he received his education by private tuition and at the Hamilton Academy, later attending Trinity University and Trinity Medical School, Toronto, graduating about 1883. Following his graduation, he was an intern at the Hamilton General Hospital, then a surgeon on the Allan Royal Mail Steamship Company. He went to the Winnipeg General Hospital as a house surgeon in 1887, and the next year became medical superintendent. In May, 1890, he resigned, but during his stay he had been instrumental in helping organize the Training School for Nurses. He was appointed to the honorary consulting staff in 1922

at that hospital's jubilee celebration. About 1890 he went to the Toronto General Hospital as acting medical superintendent, and started practice in 1891.

He was prominent in military circles, holding the rank of lieutenant-colonel on the Reserve of Officers. He was medical officer of the 2nd Brigade, Canadian Field Artillery, from 1902 to 1923. He served in the North-West Rebellion and at the outbreak of World War I, went overseas, serving in the field as medical officer of Lord Strathcona's Horse and the 2nd Indian Cavalry Brigade. He never married. He was a member of the Hamilton Club, and the United Empire Club of London, England. He was a life long Conservative. In Masonic circles he was a past master of The Barton Lodge No. 6, A.F. & A.M. and had long held the post of its archivist. He was a past president of the Irish Protestant Benevolent Society, also past president and historian of the Hamilton Medical Society. He was noted as an historical authority, both Canadian and British, and knew better than most people the stories connected with Hamilton's early days. He is survived by four nephews and one niece.

---

**Dr Follin Horace Pickel** est décédé récemment à Sweetsburg, Que., où il était né en 1866. Il avait reçu son éducation à Sweetsburg, puis à l'université Bishop de Lennoxville où il avait gradué en 1888. Retourné à Sweetsburg, il avait commencé sa carrière médicale. C'est grâce aux efforts du Dr Pickel que fut installé le système d'eau et de filtration dans cette municipalité. Il fut l'un des fondateurs de l'hôpital de Sweetsburg. Dr Pickel se présenta comme candidat conservateur aux élections de 1908, 1911, et 1925 mais ne fut pas élu. Cependant, de 1930 à 1935, sous le régime Bennett, il fut le député de Brome-Missisquoi.

---

**Dr. Edgerton Llewellyn Pope** died in Edmonton on November 23, 1949. Born in Belleville, Ont. in 1874, he graduated from Queen's University in 1895 with the degree of B.A. and took his medical training at McGill University, graduating in 1900. Following a period of postgraduate training in England, Dr. Pope became associated with the Winnipeg General Hospital and the Medical School of the University of Manitoba in 1907. From 1907 to 1923 he was active as internist in the city of Winnipeg and became Associate Professor of Medicine in the Manitoba Medical School. In 1923 he was appointed Professor of Medicine in the University of Alberta and Director of Medical Services in the University of Alberta Hospital. Dr. Pope served in these fields of activity from 1923 until his retirement in 1944. He was then appointed Director of Cancer Diagnostic Clinics for the Province of Alberta and served in that capacity until his death. He served in the R.C.A.M.C. in World War I from 1916 to 1919 and was discharged with the rank of Lieutenant-Colonel. Both as a physician and as a teacher, he made a very lasting impression on all those who came to know him. He organized the Department of Medicine in the newly formed Medical School in the University of Alberta, and was held in high regard by his colleagues and students. Dr. Pope was a man of many interests and found time to develop the cultural aspects of living in art, literature and music. He was a portrait painter of merit and made a very significant contribution toward the development of the fine arts in Edmonton. The death of his widow occurred two weeks after that of her husband.

---

**Dr. R. Glen Urquhart**, aged 50, former chief surgeon of the Connecticut State Sanatoria, died in hospital on December 9. He had been in failing health for some time but continued his practice until a few days before he entered the hospital with pneumonia. A native of Revelstoke, B.C., he graduated from McGill University, Montreal, in 1924. He entered the service of the Connecticut State Tuberculosis Commission in 1925 and in 1930 was appointed chief surgeon of the five state sanatoria, under control of the State Tuberculosis Commission. He retired in 1946.

# NEWS ITEMS

## British Columbia

In reporting the inauguration of the Diagnostic and Consultative Clinic which has been designed to serve the North Okanagan, reference was inadvertently omitted to the fact that in addition to Vernon, the cities of Penticton, Kelowna and Kamloops are also participants in the scheme. The Clinic will operate in these centres as well, utilizing their respective hospitals as headquarters.

---

The resignation of Dr. J. M. Hershey as Commissioner in charge of the B.C. Hospital Insurance Scheme, became effective recently. This leaves the B.C. Hospital Insurance Scheme temporarily without a head. The B.C. Government will, doubtless, make another appointment shortly. Dr. Hershey, according to a statement issued by himself, felt that his recommendations were not receiving the consideration he felt necessary to his continuance as Commissioner. The Government has made no formal statement on the matter.

---

Dr. Lyon H. Appleby, well-known Vancouver surgeon, has received an invitation from the Royal College of Medicine of England, to read a paper before that body in May of this year, on the Treatment of Advanced Cancer of the Rectum. This is a very signal honour, and is, we believe, the first invitation of the kind to a Canadian surgeon.

---

The new 350-bed addition to the Vancouver General Hospital is now under construction, and is already well on the way to completion. It is, we understand, the first unit in a building plan decided on for this Hospital. It may serve to relieve, in some degree, the appalling shortage of hospital beds in the city of Vancouver.

---

The pros and cons of the use of vitamin E have received considerable publicity lately. The daily press has been taking the matter up, and some recent articles in a well-known pseudo-medical Digest, have aroused public interest even further. Pharmacies report considerable demand for this preparation, and feeling runs quite high at times—those who feel that they have received relief from its use being particular vociferous.

---

The American Federation of Soroptimist Clubs, a well-known women's organization, has offered a scholarship of $1,500.00 to a Canadian medical woman for the year 1950-51, the grant to be made in April, 1950. It will be made to a Canadian graduate, and is to be used for postgraduate training in a field of her own choice. While this training need not be taken in Canada, preference will be given to applicants who signify their intention to continue practice in Canada.

J. H. MACDERMOT

---

## Manitoba

To date some 10,000 people have been x-rayed through equipment installed in the larger general hospitals of Manitoba for providing free routine chest x-ray examinations on admission. The hospitals are the Winnipeg General, St. Boniface, Victoria, Misericordia, Grace, St. Joseph's—all in Greater Winnipeg, and also the Brandon General, Dauphin General, and Portage La Prairie Hospital. Special arrangements are now under way with certain of the larger rural hospitals whereby the Sanatorium Board of Manitoba will pay for x-ray films of all their hospital admissions. These hospitals will use their own equipment and will be paid on a fee basis.

---

The Bird Construction Company, building the new Maternity pavilion of the Winnipeg General Hospital turned the structure over to the hospital on January 15..

The University of Manitoba has agreed to give an annual grant to the reference library in St. Boniface Hospital on the basis of $5.00 per undergraduate intern.

A large addition to the central part of St. Boniface Hospital is under construction.

The official connection of Dr. F. W. Jackson with the Department of Health and Public Welfare of Manitoba, in which for many years he had been Deputy Minister, ceased at the end of the year. He has been appointed to the permanent staff of the Federal Department of Health and Welfare at Ottawa. We regret the loss of Dr. Jackson who has had such intimate relations with this province. His father was a pioneer and veteran legislator of Manitoba; Fred was born and educated in this province. He practised in Wawanesa, later became secretary of the Manitoba Medical Association and Deputy Minister of Health. His capacity for reaching the core of a problem, his industry and his broad vision and idealism fit him for the position of director of health insurance studies in Canada.

Dr. Ross Mitchell has been named Governor of the American College of Surgeons.

Dr. James Gordon McFetridge, M.D., Manitoba, 1937, has received the degree of F.R.C.S.(Edin.). He will be associated with the Medical Arts Clinic of Regina.

Dr. Edward A. Jones has received the degree of Master of Orthopædic Surgery from Liverpool University, England.

A meeting of the Central District was held in Portage la Prairie on December 12. The blizzard of the previous day kept the attendance down but the spirit of the meeting was excellent. Dr. A. B. Houston, Winnipeg, spoke on Cardiac Arrhythmias with Special Reference to Quinidine and Dr. C. W. Clark on Diseases of the Rectum and Anus. ROSS MITCHELL

## New Brunswick

Dr. R. D. Roach, of Moncton has been granted his fellowship in Medicine, by the Royal College of Physicians and Surgeons of Canada.

Dr. F. D. Wanamaker, of Saint John, was re-elected president of the Saint John Branch of the associated alumni of Acadia University, at the annual meeting of the branch in November.

Dr. V. D. Davidson, of Saint John, has been appointed a governor of the American College of Physicians representing New Brunswick.

At the December meeting of the Saint John Medical Society, Dr. Arnold Branch of D.V.A. Hospital at Lancaster, introduced a discussion on thyroid disease, giving us an up-to-date résumé of the pathological picture. He was followed by Dr. Norman Skinner, who discussed diagnosis and pointed out pitfalls in this field. He stressed the danger of over diagnosis. Dr. Geo. Skinner summarized the discussions and presented a recent series of 100 operated cases—classifying types and checking complications after thorough medical preparation.

Dr. P. C. Laporte, of Edmundston has retired from the medical staff of the Hotel Dieu Hospital. Dr. Laporte has been on the staff since 1912, when he resided at St. Basil. He has had a long and impressive influence on all matters medical in the north of the province, always willing to accept responsibility and always able to do a good job. He represented his colleagues on the councils of the N.B. Medical Society, N.B. Medical Council and in the council of the C.M.A.

A. S. KIRKLAND

## Newfoundland

Prospects in the field of tuberculosis, one of the most pressing health problems in this Province, appear much brighter. The new 250-bed sanatorium at Corner Brook is expected to be completed some time this year. This will relieve considerably the acute shortage of beds available for tuberculous patients. Work is also proceeding on the renovation of two wings of the Sanatorium St. John's, which will provide an additional 120 beds. Other developments in this field include an allotment of Federal Health grants, for extending the range of tuberculosis clinic work, appointing a rehabilitation officer, and for the postgraduate training of an additional doctor in tuberculosis control work.

Extensive construction is being carried out at the Hospital for Mental and Nervous Diseases, St. John's, and will provide accommodation for 250 patients. It is expected to be completed in 1952.

The St. John's Clinical Society held its Annual General Meeting in December, 1949. The following officers were elected for the coming year: President, Dr. T. G. Anderson; Vice-president, Dr. B. J. Kennedy; Secretary-Treasurer, Dr. A. S. Lewis; Program Committee, Drs. B. J. Maher and J. B. Roberts.

Dr. J. A. Walsh, President of the Newfoundland Medical Association, has returned from Toronto, where he attended a meeting of the National Executive Committee of the Canadian Medical Association.

Dr. B. J. O'Brien has been granted a Federal Bursary, and will do postgraduate work in the field of tuberculosis.

Dr. B. J. Egan, until recently a Resident Physician at the General Hospital, St. John's, has entered general practice on Bell Island.

Dr. and Mrs. P. O'D. Gallagher have returned to Newfoundland after spending a holiday in Ireland.

Congratulations are extended to Dr. and Mrs. A. S. Lewis on the birth of a son. J. B. SQUIRE

## Ontario

In Toronto in 1930 there were 1,085 cases of diphtheria, in 1948 and in 1949 there was not a single case. In 1949 there were 574 cases of scarlet fever with no deaths; there were 1,912 cases of measles with one death; there were 196 cases of poliomyelitis with four deaths.

A new children's mental hospital will be opened in Aurora in March. The new institution, which will take 250 boys from the Ontario Hospital at Orillia, will be housed in a building formerly used as a training college by the Christian Brothers, a Catholic teaching order.

The Osler Society of the University of Western Ontario Medical School devoted its December meeting to Dr. William Beaumont (1785-1853). In discussion Dr. R. J. Rossiter said that there were about thirty cases of persistent gastric fistula mentioned in the literature. That of Madelaine St. Guard of Paris was a famous case but the scientists of that day, Claude Bernard and

Magendie did not recognize their exceptional opportunity to study gastric secretion.

---

The Toronto Academy of Medicine celebrated Osler Night on December 9. The meeting was held in conjunction with the Medical Historical Club. Personal reminiscences of Sir William were given by his nephew, Dr. N. B. Gwyn, who told of the early medical days in Toronto and Osler's transfer to McGill when the Toronto General Hospital due to some differences of opinion closed its doors to medical students for a short time. Dr. C. B. Farrar, a graduate of Johns Hopkins, spoke of his contacts with Osler as a student. Dr. C. D. Parfitt, who did postgraduate work in tuberculosis at Baltimore gave an account of his association with Osler. After the presentation of papers, the doctors and their wives adjourned to the Library where an exhibit of Osler memorabilia had been arranged by Miss Edna Poole. Much of this related to his early life in and about Toronto. Refreshments were served by the librarians.

---

The section of General Practice of the Ontario Medical Association is planning a refresher course on internal medicine at Sunnybrook Hospital early in April. Arrangements are being completed under the chairmanship of Dr. H. Gibson Hall.

---

The National Foundation for Infantile Paralysis, with headquarters in New York, has announced a research grant of $34,140 to the University of Toronto.

---

The Ontario Government has arranged for the payment of compensation to all hospital or sanatoria employees, including nurses, who develop tuberculosis through contact with patients. The Compensation Board will make the payments. All employees with more than three months' service will be covered immediately. New employees will have to wait three months before they are protected. However they will be protected for three months after they leave the hospital's employ. The brief submitted by the Ontario Medical Association and the College of Physicians and Surgeons to Mr. Justice Roach urged that this legal responsibility be undertaken by the Government. LILLIAN A. CHASE

---

Dr. Bruce Hopkins of Kingston, was elected president of the Ontario Tuberculosis Association at the Annual Meeting held in Toronto, October 20. Dr. Lovering of Hamilton was elected Vice-President.

---

A newly formed division of the Health League of Canada will undertake popular education in the fields of maternal and child health and welfare. Heading the new divisions voluntary directing committee are Dr. Nelles Silverthorne and Dr. H. B. Van Wyck. Dr. F. O. Wishart of the School of Hygiene, University of Toronto will continue to supervise the present immunization division which will function as a section of this new division.

---

The Ontario Provincial Government recently announced an additional grant of $368,000 for construction and equipment of the new Hospital for Sick Children, Toronto. This brings the provincial contribution to $1,632,000. The new hospital will have 632 beds and provision for handling over 100,000 out-patients per year. There will be 1,559 rooms; more than half will be used for research and education purposes.

---

At Smooth Rock Falls in the Cochrane district a new 17-bed hospital is scheduled for completion next spring to serve about 3,000 people in the area. The federal and provincial governments are each contributing $17,000 toward this project.

---

The Federal and Provincial Governments are each contributing more than $379,600 to the Mount Sinai Hospital, Toronto. This hospital will have 351 beds and an 86 cubicle nursery.

---

Under the Coroners' Act, the following were appointed coroners: Dr. Allan G. Minnes, Niagara Falls, for County of Welland; Dr. W. G. Green, Port Burwell, for County of Elgin. NOBLE SHARPE

---

## Quebec

Dr. Wilfrid LeBlond has been elected President of the Medical Board of L'Enfant-Jesus Hospital, Quebec City. Dr. LeBlond is Associate Professor at the Faculty of Medicine, Professor at the Faculty of Social Science (Public and Industrial Health), and Lecturer at the Faculty of Commerce of Laval University.

---

Le docteur André Leduc est revenu d'un séjour de six mois en France où il est allé parfaire ses études en bactériologie à Paris. Le docteur Leduc vient d'être nommé premier assistant du docteur Albert Bertrand au laboratoire de bactériologie de l'Hôpital Notre-Dame.

---

Le docteur Edmond Dubé, doyen de la faculté de médecine de l'Université de Montréal, a été choisi comme vice-président de la section de chirurgie du Collège Royal des médecins et chirurgiens du Canada à la dernière assemblée du 26 novembre, 1949. A cette même assemblée, les docteurs Edouard Desjardins, U. Frenette, V. Laperrière, C.-E. Lépine, J. L. Desrochers, de Montréal, W. W. Lynch, de Sherbrooke, et J. M. Bécotte, d'Arthabaska, ont été recus associés du Collège.

---

Le docteur Roland Dussault a été élu à la présidence de l'institut du rhumatisme de l'Hôtel-Dieu. Le docteur Dussault remplace le regretté docteur René Dandurand.

---

Le docteur Maurice Bélisle vient de quitter l'Hôpital Notre-Dame après y avoir terminé sa résidence en médecine. Le docteur Bélisle e'est embarqué pour la France où il fera un séjour d'études.

---

Le docteur Charles-Emile Grignon, médecin de l'Hôpital Notre-Dame a été élevé au poste de sécrétaire de la faculté de médecine de l'Université de Montréal.

---

Le docteur Paul Brodeur, chef du service de radiologie de l'Hôpital Notre-Dame a pris part au congrès de l'American Radiological Society of North America, qui s'est déroulé à Cleveland, au mois de novembre.

YVES PRÉVOST

---

Announcement is made that in May next a campaign will be held to collect $18,000,000.00 towards buildings and equipment for three hospitals in Montreal, namely, the Montreal General Hospital, the Children's Memorial Hospital and the Royal Edward Laurentian Hospital. This is to be known as the Joint Hospital Fund and the Chairman is Mr. Hartland M. Molson. "The undertaking", as Mr. Molson says, "is part of a comprehensive, long-term plan to provide modern hospital protection for the people of our community and to maintain Montreal's position as an outstanding centre of medical teaching and research. To do this we must replace old and inadequate structures with hospital buildings designed to bring to our people the benefits of modern medicine." At the Montreal General Hospital, Central Division, no new building has been constructed since 1911, and others date back as far as 1821. The Children's Memorial has also urgent needs for building, plant and beds. The Royal Edward Laurentian Hospital requires additional space for a surgical unit and to take care of the increased demands in caring for tuberculosis.

## Saskatchewan

Place names will soon appear on Saskatchewan maps honouring the early doctors who were the first to practise medicine in that part of the Northwest Territories now known as Saskatchewan. Charlton, Jukes, Edwards, Roddick and Stewart Lakes and Munroe Creek are the place names, all situated in the area immediately northwest of Meadow Lake, which have been officially adopted by the Canadian Board of Geographical Names.

Dr. J. A. Charlton was in charge of the first bacteriological laboratory in Regina which served much of the old Northwest Territories; Dr. A. L. Jukes, active in the medical field, became first registrar of the land titles office in Regina; and Dr. O. C. Edwards, Qu'Appelle, was one of the early doctors on the council of the College of Physicians and Surgeons of the Northwest Territories.

Dr. Thomas Roddick, later Sir Thomas Roddick, was the first medical director in the field during the 1885 Rebellion, and later became a member of parliament; while Dr. P. D. Stewart, Saskatoon, was influential in early development of northern mining areas.

Dr. H. E. Munroe, who started his medical practice in Saskatoon in 1904, later served as lieutenant-governor of Saskatchewan from 1930 to 1936.

---

Dr. J. E. Moran, Lashburn, was honoured by the residents of his district at a public gathering in the community hall at Lashburn. The gathering was held on December 14 when the hall was filled to capacity. Dr. Moran was presented with a guest book containing about 500 signatures and a well filled purse of money from the people in the district. The presentation was made by Dr. E. R. Peterson of Saskatoon who travelled to Lashburn for the occasion.

Dr. Moran was made a senior life member of the Canadian Medical Association in Saskatoon last June and has always been interested in Association affairs.

G. GORDON FERGUSON

---

## General

**Royal College of Physicians and Surgeons of Canada.**—The following have been admitted to Fellowship in the Royal College of Physicians and Surgeons of Canada in 1949.

FELLOWSHIP IN MEDICINE

1. Distinguished Physicians admitted without examination under the special clause of the Constitution of the College: Dr. J. S. L. Browne, Professor of Medicine, McGill University, Montreal.

2. Admitted *ad eundem gradum*: Dr. W. W. Barraclough, Toronto; Dr. J. A. Hildes, Winnipeg; Dr. D. L. Lloyd-Smith, Montreal; Dr. R. L. MacMillan, Toronto; Dr. R. D. Roach, Moncton; Dr. S. G. Ross, Montreal; Dr. G. E. Wodehouse, Toronto.

3. Admitted by examination: Drs. M. Belisle, Montreal; J. R. Bingham, Brookline, Mass., U.S.A.; H. E. Christie, Amherst; J.-Leon Desrochers, Montreal; A. St.C. Douglas, London; N. J. England, London; J. D. L. Fitzgerald, Toronto; J. A. Fownes, Montreal; A. Gold, Montreal; J. Greenblatt, Toronto; F. C. Heal, Moose Jaw; V. O. Hertzman, Vancouver; B. L. Hession, London; A. E. Hill, Montreal; G. K. Ingham, Stratford; M. W. Johnston, Toronto; B. Laski, Toronto; R. H. Lennox, Montreal; B. I. Lewis, Kingston; J. A. Lewis, London; C. J. Malloy, Montreal; A. Mackay, Montreal; J. L. McCallum, Montreal; H. W. McIntosh, Westmount; A. D. McKelvey, Toronto; T. S. G. McMurtry, Vernon; R. H. Penney, Toronto; C. P. Rance, Toronto; I. Rother, Toronto; C. Sheard, Jr., Toronto; J. L. Silversides, Toronto; P. H. Spohn, Vancouver; R. A. Starrs, Ottawa; M. J. Tuttle, Lethbridge; G. C. Walsh, Vancouver; R. H. Whiting, Edmonton; O. Z. Younghusband, Kingston.

FELLOWSHIP IN SURGERY

1. Distinguished Surgeons admitted without examination under the special clause of the Constitution of the College: Dr. W. Boyd, Professor of Pathology, University of Toronto, Toronto, Ont.; Dr. E. Desjardins, Professor of Surgery, University of Montreal, Montreal, Que.; Dr. W. W. Lynch, Sherbrooke, Quebec.

2. Admitted *ad eundem gradum*: Dr. P. M. Ballantyne, Port Arthur; Dr. B. D. Best, Winnipeg; Dr. F. W. Grauer, Vancouver; Dr. L. J. Quinn, Montreal; Dr. A. C. Kanaar, Toronto.

3. Admitted by examination: Drs. L. G. Archambault, Montreal; J. Balfour, Vancouver; D. M. Bean, Toronto; J.-M. Becotte, Arthabaska; L. Beique, Montreal; P. R. Blahey, Montreal; D. P. Bryce, Toronto; G. R. Champoux, Montreal; J. H. Charman, Halifax; J. W. Cluff, Todmorden; W. E. Collins, Ottawa; R. J. Cowan, Toronto; A. M. Crossland, Toronto; B. H. G. Curry, Toronto; W. L. Fennell, Winnipeg; J. R. Francis, Calgary; U. Frenette, Montreal; M. J. Furman, Winnipeg; J. S. Gardner, Calgary; F. Gibson, Montreal; A. W. Hardy, Edmonton; L. J. Harris, Toronto; S. M. Hudecki, Hamilton; G. E. Irwin, Ottawa; T. C. Jewell, Toronto; A. F. Jones, Westmount; C. A. Kyle, Toronto; C. E. Lamoureux, Trois-Rivieres; M.-L. Lamoureux, Montreal; V. Laperriere, Montreal; E. Lepine, Montreal; R. M. Levine, Montreal; T. M. Lockwood, Montreal; J. W. Long, Toronto; R. C. Long, Montreal; J. L. Macarthur, Montreal; D. L. MacIntosh, Toronto; F. G. Mack, Halifax; W. L. C. McGill, Toronto; J. A. McLachlin, London; B. Michalyshyn, Montreal; J. H. Minden, Baltimore, Maryland, U.S.A.; C. A. Moore, Montreal; J. P. Moreau, Edmonton; D. R. Murphy, Montreal; R. A. Mustard, Toronto; H. L. Ormsby, Toronto; W. E. Ortved, Toronto; R. E. Pow, Toronto; C. J. Robson, Toronto; J. W. Rogers, Toronto; C. W. M. Service, Toronto; F. F. Sypher, Toronto; D. A. Thompson, Bathurst; F. J. Tweedie, Mount Royal; D. J. Van Wyck, Toronto; W. B. Wallace, Toronto; G. A. Waugh, Weston; R. H. Wesley, Toronto; F. H. Wigmore, Moose Jaw; G. E. P. Wilson, Toronto.

Certification was granted to 213 candidates in the following subjects: anæsthesia 22, dermatology and syphilology 9, general surgery 32, internal medicine 29, neurology and psychiatry 1, neurology 1, psychiatry 10, obstetrics and gynæcology 14, gyæcology 2, ophthalmology 18, orthopædic surgery 4, otolaryngology 14, pædiatrics 26, pathology and bacteriology 2, pathology 5, bacteriology 1, physical medicine 2, plastic surgery 1, diagnostic and therapeutic radiology 6, diagnostic radiology 4, therapeutic radiology 6, urology 4.

---

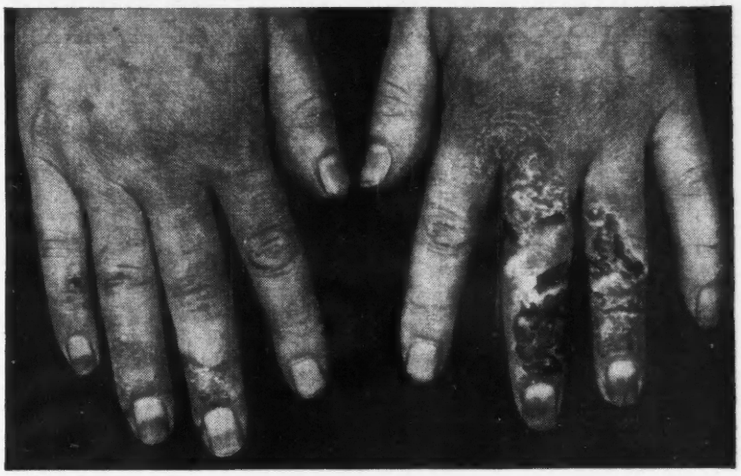
**The Medical Library Association Scholarships** for 1949-50 have been granted to three foreign medical librarians. The recipients are Miss E. E. J. Oehrens, Assistant Librarian at U.N. Economic Commission for Latin America, Santiago, Chile; Miss I. I. J. Oehrens, Assistant in the Biblioteca de la Escuela de Salubridad, Universidad de Chile; and Mr. J. C. Secondi, student of medicine and a graduate of the Library School of the University of Montevideo. The scholarship program, which is being carried out in co-operation with the Institute of International Education, is arranged so that it will meet the individual requirements and special interests of each Fellow. Each one has an opportunity to attend orientation courses for foreign students before beginning the library projects; to serve as an observer in various types of medical libraries (hospital, society, university, national, etc.) and to visit medical libraries in the East, South, and Mid-West before the termination of the program.

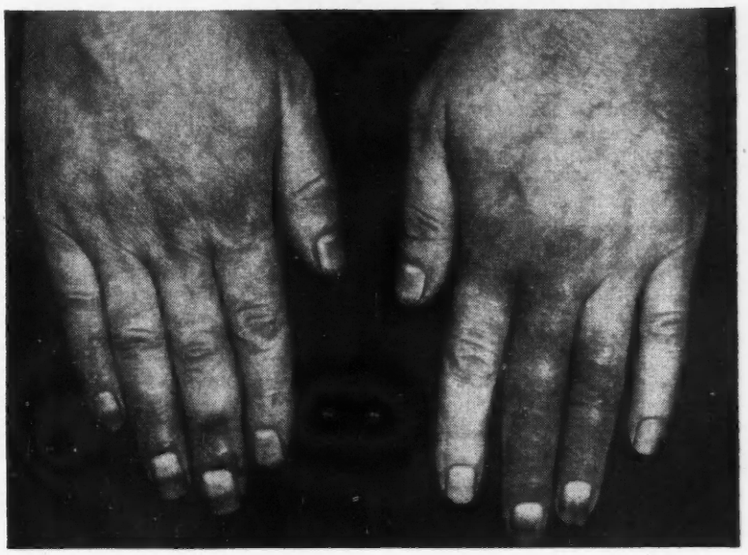
---

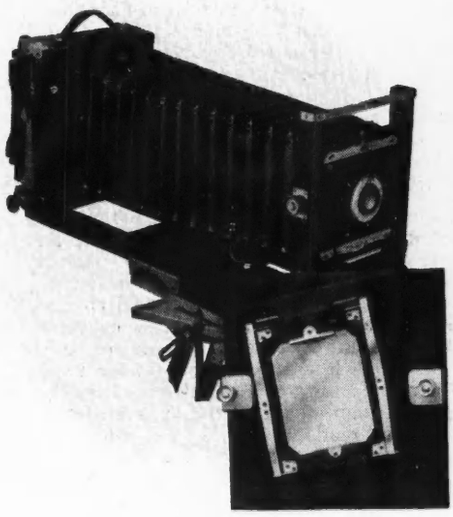
The fourteenth Annual Convention of the Canadian Society of Laboratory Technologists will take place at the Admiral Beatty Hotel in Saint John, N.B., on June 26, 27 and 28, 1950. An invitation is extended to all those interested in attending. For further information

# Picture the patient's progress

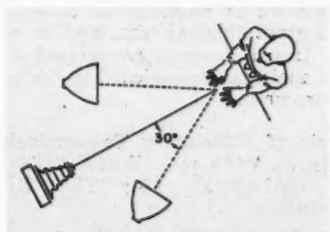
*...with photograph*
*...after photograph*







To obtain before-and-after photographs such as these . . . to carry out dozens of other daily assignments . . . many clinics and hospitals are using the Kodak View Camera 2D, 5x7. With its multiple adjustments . . . its swings . . . its rising and falling front . . . its interchangeable Lantern Slide Back, this handy unit serves many purposes well. For further information about Kodak View Camera 2D, see your nearest photographic dealer . . . or write to Canadian Kodak Co., Limited, Toronto 9, Ontario.




*Two lights at 30° to camera axis provide even illumination. With this type of subject, strong modeling by crosslighting is not necessary.*

*Major Kodak products for the medical profession*

X-ray films; x-ray intensifying screens; x-ray processing chemicals; electrocardiographic papers and film; cameras—still- and motion-picture; projectors—still- and motion-picture; enlargers and printers; photographic films—color and black-and-white (including infrared); photographic papers; photographic processing chemicals; synthetic organic chemicals; Recordak products.

*Serving medical progress through Photography and Radiography*

Kodak
TRADE-MARK

please write Miss Charlotte Barron, 20 Enterprise St., Moncton, or Sr. Theresa Carmel, St. Joseph's Hospital, Saint John, N.B.

---

Candidates for the certificate of the American Board of Ophthalmology are accepted for examination on the evidence of a Written Qualifying Test. These Tests are held annually in various parts of the United States. Applications are now being accepted for the 1951 Written Test. They will be considered in order of receipt until the quota is filled. Practical examinations for acceptable candidates, 1950, Boston, May 22 to 26; Chicago, October 2 to 6; West Coast, January, 1951. Executive office, Cape Cottage, Maine. Officers for 1950, Chairman, Dr. Algernon B. Reese; Vice-Chairman, Dr. John H. Dunnington; Secretary-Treasurer, Dr. Edwin B. Dunphy.

## *Book Reviews*

**Diagnosis in Gynæcology.** J. V. Ricci, Clinical Professor of Gynæcology and Obstetrics, New York Medical College. 259 pp. The Blakiston Company, Philadelphia and Toronto, 1948.

This book is written in a clear and concise manner, which will be attractive to the student, general practitioner and specialist alike. The first six chapters form a firm basis for the approach to a gynæcological patient, beginning, of course, with pelvic anatomy and embryology. One chapter is entirely devoted to the female sex hormones and their chemistry. This difficult subject is presented with great clarity and is well correlated with the physiological and clinical phenomena occurring in the female genital tract. The history and physical examination of the gynæcological patient are dealt with in a business-like manner. The remainder of the book, comprising another eight chapters, is devoted to the discussion of actual diagnosis and is presented and classified according to anatomical divisions. Thus each section begins with a classification of etiological factors causing disease in the region under discussion. This novel method of presentation lends itself particularly to the purposes of the medical student. As stated by the author, this work is intended as a supplement to the conventional gynæcological text, and is not intended to replace it. It can be well recommended to those who wish to weld their gynæcological knowledge into a useful working instrument.

**Fundamentals of Pulmonary Tuberculosis.** Edited by E. W. Hayes. 480 pp., illust. $12.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1949.

This book is a notable contribution to the prevention and control of tuberculosis. The opening chapters contain an account of present concepts concerning the bacteriology and pathology of tuberculosis. These are followed by chapters on the classification of reinfection pulmonary tuberculosis and on the diagnosis and treatment of the varied manifestations of pulmonary tuberculosis. This portion contains several features of special interest, namely, an account of the rôle of the bronchial tree in the pathogenesis of pulmonary tuberculosis and a special chapter on tuberculous tracheobronchitis, a chapter on the place of streptomycin in the treatment of tuberculosis, and a brief account of the psychosomatic aspects of this disease. The chapters which immediately follow the foregoing have to do with collapse therapy, both the simpler forms of mechanical therapy and major surgical procedures. These chapters contain the indications for collapse therapy, brief accounts of the procedures employed, and notes on the kinds of results that can be expected to follow collapse therapy. They also include an account of the indications for, and the results to be expected from, excision of tuberculous pulmonary tissues. The chapter which follows those which have to do with mechanical therapy and surgical procedures contains a presentation of the public health aspects of tuberculosis control. The concluding chapters have to do with various extra pulmonary forms of tuberculosis, notably Tuberculosis of the Larynx, Tuberculous Enterocolitis and Tuberculosis of the Genito-urinary System, and with, in addition, Silicosis and Tuberculosis, Diabetes and Tuberculosis and Pregnancy and Tuberculosis.

**La differenciation du sexe et l'intersexualite chez les vertebres.** K. Ponse, Associate Professor of the University of Geneva, Switzerland. 366 pages, 170 figures. F. Rouge, Lauzanne, Switzerland.

This is an excellent survey of the factors involved in sex differentiation and the production of intersexuality. Dr. Ponse spent many years in personal research concerning these subjects and hence discusses them with great authority. The monograph contains an extensive bibliography and a highly critical and original evaluation of pertinent data. The illustrations are excellent and the book can be highly recommended, mainly to those interested in the fundamental factors governing the differentiation of sex characteristics, but also to physicians who wish to have a reliable reference book on humoral factors involved in the production of intersexes.

**Microbiology and Man.** J. Birkeland, Professor of Bacteriology, Ohio State University, Columbus. 525 pp., illust., 2nd ed. $5.00. The Williams and Wilkins Co., Baltimore, 1949.

According to the author the book is designed "as an elementary text for the student who plans to take but one or two courses in microbiology". The book is divided into four sections. The first section dealing with fundamentals of microbiology is clear and concise. The author writes in a pleasant and almost conversational style and in difficult spheres is careful not to be wedded to a word. This is especially true in his treatment of enzyme, virus and gene. The second section deals with the general aspects of microbic infection in man. While eminently readable it does not reflect the philosophical tone of the first section. In a book of this size dealing with the relationship of microbes to man one would have expected more generous treatment of the natural history of disease which is included in a chapter of thirteen pages. Much of this information instead of being general is given in specific terms in the large third section which deals in detail with the common infectious diseases. This detail and tendency to put disease in compartments is not justified in a book written as an introduction to a vast field. One gets the impression in this latter section that the author has ploughed through many books to get his data.

Dr. Birkeland is obviously at home in the general biology of micro-organisms and in the practical application of the facts pertaining to this field. The first half of the book is a stimulating introduction to microbiology. No doubt this accounts for the popularity of the book. The material in the second half is difficult to digest.

**Fundamentals of Internal Medicine.** W. M. Yater, Director, Yater Clinic, Washington, D.C. 1451 pp., illust., 3rd ed. Appleton-Century-Crofts, Inc., New York, 1949.

This textbook fills a need of undergraduates and practitioners in providing a somewhat condensed, yet complete, summary of the field of internal medicine. Nineteen authors contribute to the book but Dr. Yater is responsible for by far the largest part. Clear and readable sections on all the expected subjects are presented. Heart disease is taught according to the criteria of the American Heart Association. Peripheral vascular diseases are outlined clearly, and the methods of their study are precisely indicated. The reviewer found the material on Electrocardiography especially lucid, and unencumbered by the very intricate details often en-

countered. In addition to the more orthodox sections, one finds with satisfaction brief but very informative sections on diseases of the eye, the ear and the skin, which serve to orient these disorders in the field of general medicine. A separate chapter on Inhalational Therapy presents much useful material in a short space, with good illustrations. Treatment throughout is taught clearly, but necessarily briefly. In an interesting chapter on "symptomatic and supportive treatment", management by rest, food, liquids, sedation and nursing methods is outlined. Antibiotic therapy is discussed with its most up to the minute applications. This volume can be recommended unreservedly.

**Technique of Pulmonary Resection.** R. H. Overholt, Clinical Professor of Surgery, Tufts College Medical School; and L. Langer, Instructor in Surgery, University of Cordoba, Service of Professor Juan Martin Allende, Cordoba, Argentina. 193 pp., illust. $10.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1949.

Dr. Overholt's best known contribution to the rapidly developing field of pulmonary resection consists of his recommendation of the face-down position, local anæsthesia (plus endotracheal tube), mattress suture for bronchial closure, steel clips for rib approximation, and preliminary bronchial ligation with subsequent higher amputation. The book covers these subjects in an adequate manner and, although he retracts some of his statements in an "afterword" at the end, no student of the subject can be thoroughly informed without a careful reading of all his proposals. A very attractive feature of this volume is the thorough review of the anatomy of the pulmonary vessels and bronchi. The arteries and veins are particularly well done, using Jackson and Haber's bronchial terminology as a basis for naming the vessels.

**Skin Diseases in General Practice.** F. R. Bettley, Physician for Diseases of the Skin, Middlesex Hospital, London. 260 pp., illust., 21s. Eyre & Spottiswoode Ltd., London, 1949.

The author's aim in this small book is expressed in his own words: "I have . . . narrowed my subjects to those diseases which I find so common that a clear working knowledge of them is of constant value in general practice". In his selection and presentation of these diseases he has succeeded admirably. Treatment is up-to-date, taking cognizance of such matters as the sensitizing proclivities of the sulfonamides and penicillin, and the use of anti-histamine agents. The usefulness of roentgen therapy in numerous situations has perhaps been given too much attention for a book designed for the general practitioner, who is not qualified to handle such a modality. In dealing with the vexed problem of eczema versus dermatitis, the author has not done much to clarify the subject. There does not seem to have been much gained by lifting contact dermatitis, or contact eczema as he calls it, out of the chapter on occupational dermatoses, and dividing the subject of atopic dermatitis under two separate headings, infantile eczema and flexural eczema. The key to this confusion is partly given by his position in regarding eczema as a purely descriptive term. Despite what appears to the reviewer as minor defects in these respects, the general practitioner will find this an extremely practical and valuable book to have readily at hand. The illustrations are well chosen and well produced. The price of $7.50 asked by the Canadian distributors seems excessive for a book published at a price little more than half of this.

**Textbook of Medicine.** Edited by Sir John Conybeare, Physician to Guy's Hospital, London. 875 pp., illust., 9th ed. $7.50. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada Ltd., Toronto, 1949.

A textbook of medicine which has gone through nine editions within twenty years can be fairly said to have established a place in medical literature. The success of Conybeare's textbook can be attributed to its clarity, conciseness, convenient size and excellent type. It has between its covers most of what the undergraduate student needs to know of general medicine. The new edition includes a moderate amount of revision and brief accounts of the newer developments. The sections on psychological medicine and diseases of the skin are retained and are well written. The book serves as a general introduction to medicine and can be recommended to the undergraduate student and the general practitioner. Although eighteen authors have contributed to its production there is no indication of disjointed presentation in the book.

**Thomas Jones Ridlon.** H. W. Orr, Chief Surgeon, Nebraska Orthopædic Hospital, Lincoln, Nebraska. Supplement by A. Steindler, Professor of Orthopædic Surgery, State University of Iowa Medical School, Iowa City. 253 pp., illust. $5.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1949.

Here in charming and intimate fashion is told the story of the two great masters of orthopædic surgery, Hugh Owen Thomas and Sir Robert Jones of Liverpool, and the way in which their ideas were incorporated in American medicine mainly through the influence of John Ridlon of Chicago. The book should prove fascinating reading to orthopædic surgeons and hardly less so to those physicians who are interested in the way in which the ideas of an original thinker gradually make themselves felt in medical practice. To the surgeon immersed in contemporary literature and thereby always in danger of losing a sense of perspective, this book's most valuable function will be to set out Thomas's teachings and ideas. Dr. Orr does this admirably by quoting extensively from Thomas's writings and through the commentaries of Thomas's famous nephew, Sir Robert Jones and their American disciple, John Ridlon, relating these ideas and principles to present practice. The discussion is always on an informal plane and is illuminated by personal reminiscences, contemporary records and a wealth of anecdote. There is a Supplement in the form of a tribute to Ridlon written by the Nestor of American orthopædic surgery, Dr. Arthur Steindler. An annotated bibliography illustrating the text makes the book more valuable and gives it clinical as well as biographical significance.

The reviewer must confess to being put off at first by the paper and montage used by the publisher in this volume. This is a personal reaction, however, and in no way detracts from what is a most interesting account of the epic of the "St. Thomas splint".

**Tuberculosis in History.** S. L. Cummins, late Colonel, Army Medical Services. 205 pp., illust. $5.25. Baillière, Tindall & Cox, London; Macmillan Co. of Canada Ltd., Toronto, 1949.

The author has had a lifetime's experience with the study of tuberculosis, which has enabled him not only to describe but to appraise the work of the early pioneers in this field. The book is divided into three sections, the first describes the work of the British phthisiologists, beginning with Bennet in the 17th century, and ending with Budd in the 19th, including Sydenham, and the Liverpool physician, Carson, who was the first to experiment with and use artificial pneumothorax in the treatment of pulmonary tuberculosis, his first report being published in 1822. The author believes that Carson, and not the Italian Forlanini, whose paper was published in 1894, should be given the credit of being the originator of this form of collapse therapy. The second section deals with the work of the continental phthisiologists, including Auenbrugger, Corvisart, and Laënnec, while the third and last section contains a description of the work of Trudeau and Koch. The author traces the gradual evolution of the concept of consumption as an infectious disease, culminating in the publication of Koch's paper in 1882 in which he described the tubercle bacillus. This book will be of interest to the medical historian, specialist in tuberculosis, and general reader.

Continued on page 31

## *Books Received*

Continued from page 218

Books are acknowledged as received, but in some cases reviews will also be made in later issues.

---

**Tuberculosis Nursing.** J. G. Eyre, Senior Sister Tutor, St. Helier Hospital, Carshalton, Surrey. 304 pp., illust. 21s. H. K. Lewis & Co. Ltd., London, 1949.

**Essentials of Orthopædics.** P. Wiles, Hon. Orthopædic Surgeon, Middlesex Hospital and King Edward Memorial Hospital. 486 pp., illust. J. & A. Churchill Ltd., London; The Blakiston Co., Philadelphia and Toronto, 1949.

**Factors of Evolution.** I. I. Schmalhausen, formerly member of the Academy of Sciences of U.S.S.R. Translated by I. Dordick, Department of Geography, The Johns Hopkins University; edited by T. Dobzhansky, Department of Zoology, Columbia University. 327 pp., illust. The Blakiston Company, Philadelphia and Toronto, 1949.

**Operative Technique in Specialty Surgery.** Edited by Warren H. Cole, Professor and Head of the Department of Surgery, University of Illinois College of Medicine. 725 pp., illust. $14.00. Appleton-Century-Crofts, Inc., New York, 1949.

**Shearer's Manual of Human Dissection.** Edited by C. E. Tobin, Associate Professor of Anatomy, The University of Rochester School of Medicine and Dentistry. 286 pp., illust., 2nd ed. The Blakiston Co., Philadelphia and Toronto, 1949.

**Principles of Human Genetics.** C. Stern, University of California, Berkeley. 617 pp., illust. W. H. Freeman and Co., San Francisco, California, 1949.

**Clinical Interpretation of Laboratory Tests.** R. H. Goodale, Pathologist at the Worcester City Hospital. 605 pp., illust. $8.50. F. A. Davis Co., Philadelphia; The Ryerson Press, Toronto, 1949.

**Blood and Plasma Transfusions.** Max M. Strumia, Associate Professor of Pathology, Graduate School of Medicine, University of Pennsylvania, and John J. McGraw, Instructor in Pathology, Graduate School of Medicine, University of Pennsylvania. 497 pp., illust. $9.75. F. A. Davis Co., Philadelphia; The Ryerson Press, Toronto, 1949.

**Clinical Neurology.** B. J. Alpers, Professor of Neurology, Jefferson Medical College, Philadelphia. 846 pp., illust., 2nd ed. $12.50. F. A. Davis Co., Philadelphia; The Ryerson Press, Toronto, 1949.

**Mobilization of the Human Body.** H. E. Billig and E. Loewendahl. 65 pp., illust. $2.00. Stanford University Press, Stanford, California, 1949.

**Clinical Surgery.** C. F. M. Saint, formerly Professor of Surgery, University of Cape Town. 383 pp., illust., 2nd ed. 45s. Juta & Co. Ltd., Cape Town and Johannesburg; Stechert-Hafner Inc., New York, N.Y., 1949.

**Golden Jubilee World Tribute to Dr. Sidney V. Haas.** 34 pp. The Committee for the Golden Jubilee Tribute to Dr. Sidney V. Haas.

**A Textbook of Surgery.** American Authors. Edited by F. Christopher, Professor of Surgery, Northwestern University Medical School, Chief Surgeon, Evanston (Illinois) Hospital. 1550 pp., illust., 5th ed. $14.50. W. B. Saunders Co., Philadelphia; McAinsh & Co. Ltd., Toronto, 1949.

Continued on page 53

JOURNAL OF

**Canadian Medical Association**

Editorial offices — 3640 University St., Montreal 2

General Secretary's office—135 St. Clair Ave. W., Toronto

**Subscription rates:** The Journal is supplied only to paid up members of the Canadian Medical Association with the following exceptions: for medical libraries, hospitals and doctors residing outside of Canada, the annual subscription is $10.00; for medical students residing in Canada there is a special rate of $2.50 per annum. All subscriptions and related correspondence should be addressed to the General Secretary's office at 135 St. Clair Avenue West, Toronto 5, Ontario.

**Contributors:** Articles are accepted on condition that they are contributed solely to this Journal. Material contributed to this Journal is covered by copyright, and permission must be obtained for its reproduction either in part or in whole.

Manuscripts must be typewritten, double spaced, and the original copy.

Papers should be kept below 4,000 words wherever possible. Whilst not necessarily a cause for rejection, excessive length of an article is undesirable.

References: in the case of a journal arrange as follows: author (JONES, A. B.), title, journal, volume, page, year. In the case of a book: WILSON, A., Practice of Medicine, Macmillan, London, 1st ed., p. 120, 1922.

**Illustrations:** A limited number will be accepted. Photographs should be clear: drawings should be in india ink on white paper. All unmounted. Legends to be typed separately.

**Reprints:** May be ordered upon forms sent with galley proofs.

**News:** The Editor will be glad to consider any items of news that may be sent in by readers.



## *Classified Advertisements*

Send copy to Canadian Medical Association, 3640 University Street, Montreal, not later than the fifteenth of the month previous to issue.

Rates: $2.50 for each insertion of 40 words or less, additional words 5c each.

**ANNOUNCEMENT: FIRST INTERNATIONAL CARDIO-VASCULAR CONGRESS,** September 3 to 9, 1950, Paris, France. Those planning to attend should register as early as possible. Registration fee for each member of Congress is $20.00; for guest accompanying Congressist $10.00. Money should be sent to: 1er Congrès International de Cardiologie; mail addressed to: Mme. Claire Soulié, Secretaire Administratif, 78 rue de l'Abbé-Groult, Paris (15e), France. Those in Canada who propose making scientific contributions at meetings of Congress should send title and summary of communications to Secretary of Canadian Heart Association: Dr. Harold N. Segall, 1538 Sherbrooke St. W., Montreal, Que.

**McGILL UNIVERSITY TRAINING IN ANÆSTHESIA.**

Courses:

1. For general practitioners.
2. For requirements of American Board and Canadian Certification.
3. For University Diploma.

Apply: Wesley Bourne, Professor of Anæsthesia, McGill University, Montreal 2, Canada.

**MEDICAL LITERARY RESEARCH BUREAU.** — Bibliographies, abstracts, manuscripts from old or current medical or allied literature. Photostats provided. Ample reference facilities. Reynolds Hayden, M.D. (Capt., M.C., U.S.N., Ret.) Director, 5411 Potomac Ave., N.W., Washington 16, D.C.

**INTERNSHIPS IN ANÆSTHESIA.**—Applications will be received from graduates of approved medical schools for internship in the Department of Anæsthesia, Royal Victoria Hospital, Montreal. One year of approved internship is a pre-requisite. Term of service, either one or two years from the date of appointment. Salary and maintenance. Appointments begin June 1, July 1, and August 1, or earlier. A wide experience in the various techniques is afforded. Address applications to: The Superintendent, Royal Victoria Hospital, Montreal 2, Quebec.

**NOTICE.**—APPLICATION FOR INTERNSHIP AT ST. LUKE HOSPITAL. St. Luke Hospital in Montreal will consider the applications of doctors requesting rotating internship through its various services. St. Luke Hospital has a capacity of 456 beds and is approved by Canadian Medical Association and also approved by the American College of Surgeons; the quarters for interns were very recently furnished and offer first rate accommodation; salary, $75.00 per month through the first year; $100.00 per month the following year. Written applications should be sent to Dr. Harold Tétreault, St. Luke Hospital, 1058 St. Denis Street, Montreal, Que.

**WANTED.**—Am willing to pay reasonable price to retiring general practitioner for house, furnished or unfurnished, and office equipment in town with hospital facilities. Apply to Box 824, Canadian Medical Association Journal, 3640 University Street, Montreal.

**POSITION WANTED.**—McGill Graduate (1949) with one year internship in a general hospital, desires locum tenens for July and August in a general practice, preferably in the Maritime Provinces. Apply to Box 823, Canadian Medical Association Journal, 3640 University Street, Montreal.

**POSITION WANTED.** — Canadian born obstetrician and gynæcologist desires association with clinic or specialist. Excellent general training previous to specialty. Member of American Board of Obstetrics and Gynæcology and F.A.C.S. Apply to Box 815, Canadian Medical Association Journal, 3640 University Street, Montreal.

**POSITION WANTED.**—Bilingual registered nurse desires position either industrial or in medical office. Tel. No. TA 6203, Montreal.

**FOR SALE.**—Opportunity for Doctor. Rapidly growing Lambeth, 5 miles west of London, Ontario. Doctor's home and office on attractive corner lot near centre of village on main highway No. 2. In excellent condition. Owner transferred to Toronto and must sell. Owner L. M. Cook, Metcalf 8783 ring 33 London or Wes Daniels, Realtor, Metcalf 2792, London.

**FOR SALE.**—Fine practice in South Western Ontario with fully equipped office. Immediate possession; owner specializing. Adjoining office is a building suitable for clinic or private hospital. Apply to Box 828, Canadian Medical Association Journal, 3640 University Street, Montreal.

Continued on Page 34

## *Books Received*

Continued from page 31

**Brain Tumours and Care of the Neurosurgical Patient.** E. Sachs, Research Associate in Physiology, Yale University, New Haven; formerly Professor of Clinical Neurological Surgery, Washington University School of Medicine, St. Louis. 552 pp., illust., 2nd ed. $16.50. C. V. Mosby Co., St. Louis; McAinsh & Co. Ltd., Toronto, 1949.

**Roentgen Diagnosis of Diseases of the Skull.** M. Ritvo, Assistant Professor of Radiology, Harvard Medical School Instructor in Radiology, Tufts Medical School, Boston, Massachusetts. Annals of Roentgenology Vol. xix. 409 pp., illust. $16.00. Paul B. Hoeber Inc., New York, 1949.

**Modern Practice in Ophthalmology 1949.** Edited by H. B. Stallard, Surgeon, Moorfields, Westminster and Central Eye Hospital, London. 524 pp., illust. Butterworth & Co. (Publishers) Ltd., London, 1949.

**Modern Practice in Anæsthesia 1949.** Edited by F. T. Evans, Honorary Anæsthetist, St. Bartholomew's Hospital, London. 566 pp., illust. Butterworth & Co. (Publishers) Ltd., London, 1949.

**Varicose Veins.** R. R. Foote, London. 225 pp., illust. Butterworth & Co. (Publishers) Ltd., London, 1949.

**Roentgen-ray Examination of the Digestive Tract.** R. Golden, Professor of Radiology, The College of Physicians and Surgeons, Columbia University; Director of the Department of Radiologic Service, The Presbyterian Hospital, New York. 350 pp., illust. Thomas Nelson & Sons, New York, N.Y., 1949.

**Vision its Development in Infant and Child.** A. Gessell, F. L. Ilg and G. E. Bullis. 330 pp., illust. $6.50. Paul B. Hoeber Inc., New York, 1949.

**The British Pharmaceutical Codex 1949.** Published by direction of the Council of the Pharmaceutical Society of Great Britain. 1562 pp. £3.3.0. The Pharmaceutical Press, London, Eng.; $13.00. McLelland & Stewart Ltd., Toronto, 1949.

**Author, Publisher, Printer Complex.** R. S. Gill. 144 pp., illust., 2nd ed. $1.50. The Williams & Wilkins Co., Baltimore, 1949.

**Injuries of the Brain and Spinal Cord and Their Coverings.** Edited by S. Brock, New York University. 783 pp., illust., 3rd ed. $10.00. The Williams & Wilkins Co., Baltimore, 1949.

**Streptomycin — its Nature and Practical Application.** Edited by S. A. Waksman, New Jersey Agricultural Experiment Station, Rutgers University. 618 pp., illust. $10.00. The Williams & Wilkins Co., Baltimore, 1949.

**Female Sex Endocrinology.** C. H. Birnberg, Associate Obstetrician, Chief of Female Sex Endocrinology, and Endocrine Laboratory, Jewish Hospital of Brooklyn. 134 pp., illust. $5.00. J. B. Lippincott Co., Philadelphia, London and Montreal, 1949.

**Histopathology of the Skin.** W. F. Lever, Instructor in Dermatology, Harvard Medical School. 449 pp., illust. $12.50. J. B. Lippincott Co., Philadelphia, London and Montreal, 1949.

**The Rat in Laboratory Investigation.** Edited by E. J. Farris, Associate Member in Anatomy, Executive Director, The Wistar Institute of Anatomy and Biology; and J. Q. Griffith, Jr. John Q. Griffith, Jr., Research Foundation, Philadelphia. 542 pp., illust., 2nd ed. $18.00. J. B. Lippincott Co., Philadelphia, London and Montreal, 1949.

**Essentials of Obstetrical and Gynæcological Pathology.** R. L. Faulkner, Assistant Professor of Gynæcology, The Western Reserve Medical School; and M. Douglass, formerly Assistant Professor of Gynæcology, The Western Reserve Medical School. 357 pp., illust., 2nd ed. $10.00. The C. V. Mosby Co., St. Louis; McAinsh & Co., Ltd., Toronto, 1949.

**Clinical Diagnosis by Laboratory Examinations.** J. A. Kolmer, Professor of Medicine in the School of Medicine and the School of Dentistry of Temple University. 1212 pp., illust., 2nd ed. $12.00. Appleton-Century-Crofts, Inc., New York, 1949.

**Clinical Audiology.** M. Saltzman, Assistant Professor of Otorhinology, Temple University School of Medicine. 195 pp., illust. $5.00. Grune & Stratton, New York, 1949.

**Acute Laryngotracheobronchitis.** A. H. Neffson. 197 pp., illust. $5.00. Grune & Stratton, New York, 1949.

**Clinical Examination of the Nervous System.** G. H. Monrad-Krohn, Professor of Medicine in the Royal Frederick University, Oslo. 459 pp., illust., 9th ed. $5.00. Paul B. Hoeber, Inc., New York and London, 1949.

**Microbiology.** F. C. Kelly, Associate Professor of Bacteriology, The University of Oklahoma School of Medicine; and K. E. Hite, formerly Assistant Professor of Bacteriology, The University of Chicago. 592 pp., illust. $6.50. Appleton-Century-Crofts, Inc., New York, 1949.

Continued on page 79

## *Books Received*

Continued from page 53

**Neoplasms of the Dog.** R. M. Mulligan, Professor of Pathology in the University of Colorado Medical Centre School of Medicine. 135 pp., illust. $4.00. The Williams & Wilkins Co., Baltimore, 1949.

**Hearing Tests and Hearing Instruments.** L. A. Watson and T. Tolan. 597 pp., illust. $7.00. The Williams & Wilkins Co., Baltimore, 1949.

**Diseases of the Heart.** C. K. Friedberg, Associate Physician, Mount Sinai Hospital, New York. 1081 pp., illust. $13.25. W. B. Saunders Co., Philadelphia and London; McAinsh & Co. Ltd., Toronto, 1949.

**Thyroid Hormones and Their Action.** G. Mansfield, Professor of Physiology, University of Budapest. Translated by E. Pulay. 157 pp., illust. 24/-. Frederick Muller Ltd., London, 1949.

**Klinische Endokrinologie.** A. Jores, O. Professor, Direktor der II. Med. Universitats-Klinik, Hamburg-Eppendorf. 428 pp., illust. DMark 39.60. Springer-Verlag, Berlin, Gottingen, Heidelberg, 1949.

**Physiologic Basis of Operations for Duodenal, Gastric and Gastro-jejunal Ulcer.** H. W. Mayo, Associate in Surgery, Medical College of the State of South Carolina, Charleston, S.C. 86 pp. $4.00. The C. V. Mosby Co., St. Louis; McAinsh & Co. Ltd., Toronto, 1949.

**The Doctor's Profession.** Edited by D. T. Jenkins. 129 pp. 4/6. SCM Press Ltd., London, Eng., 1949.

**Fractures.** P. B. Magnuson, Professor of Bone and Joint Surgery and Chairman of the Department, Northwestern University Medical School; and J. K. Stack, Assistant Professor of Bone and Joint Surgery, Northwestern University Medical School. 537 pp., illust., 5th ed. $9.00. J. B. Lippincott Co., Philadelphia, London and Montreal, 1949.

**Human Pathology.** H. T. Karsner, former Professor of Pathology, Western Reserve University. 927 pp., illust., 7th ed. $14.50. J. B. Lippincott Co., Philadelphia, London and Montreal, 1949.

**Biology of Mental Defect.** L. S. Penrose. 285 pp., illust. 21s. Sidgwick & Jackson Ltd., London, 1949.

[Canad. M. A. J.
[Feb. 1950, vol. 62